QUEENSLAND

GEOGRAPHICAL

JOURNAL

New Series

QUEENSLAND GEOGRAPHICAL JOURNAL

(NEW SERIES).

INCLUDING THE PROCEEDINGS OF THE ROYAL GEOGRAPHICAL SOCIETY OF AUSTRALASIA, QUEENSLAND.

38th SESSION, 1922-23.

J. P. THOMSON, C.B.E., LL.D., HON. F.R.S.G.S., ETC., ETC., *Honorary Editor.*

The Authors of Papers are alone responsible for the opinions expressed therein.

VOL. XXXVIII.

PUBLISHED AT BRISBANE BY THE ROYAL GEOGRAPHICAL SOCIETY OF AUSTRALASIA, QUEENSLAND.

NOTE.—All communications should be addressed to the Hon. General Secretary, at the Rooms of the Society, Public Library Building, William Street, Brisbane.

The Royal Geographical Society of Australasia

(QUEENSLAND). Founded 1885.

39TH SESSION.

616518
10.8.55

G
51
Q83
v.38-44

OFFICERS:

Patron:

His Excellency Rt. Hon. LORD FORSTER, G.C.M.G., Governor-General, etc.

Vice-Patron:

Rt. Hon. W. M. HUGHES, K.C., etc.

President:

His Excellency Rt. Hon. SIR MATTHEW NATHAN, G.C.M.G., F.R.G.S., etc.

Vice-Presidents:

His Grace ARCHBISHOP DUHIG, D.D. Hon. J. HUXHAM, M.L.A.
Hon. W. F. TAYLOR, M.D., F.R.G.S.A.

J. P. THOMSON, C.B.E., LL.D., Hon. F.R.S.G.S. (Edin.), etc.
Hon. General Secretary and Treasurer:

Council, 1923-1924:

F. B. CAMPBELL FORD, Esq., F.R.G.S.A.
Prof. E. J. GODDARD, B.A., D.Sc.
A. HERTZBERG, Esq.
Wm. MOFFATT, Esq.
Prof. H. C. RICHARDS, D.Sc.
G. W. WHATMORE, Esq.
L. A. WILKINSON, Esq.

Hon. Librarian:

HUGH MACINTOSH, Esq.

Bankers:

THE BANK OF QUEENSLAND, LIMITED, AND COMMONWEALTH SAVINGS BANK.

Hon. Auditor:

Major A. J. BOYD, F.R.G.S.A.

Hon. Lanternist:

H. W. MOBSBY, Esq., F.R.S.A., F.R.G.S.A.

Hon. Solicitors:

Messrs. J. F. FITZGERALD and WALSH.

Contents.

VOL. XXXVIII.

	Page.
The Physiography of the Lower Fitzroy Basin, by F. Jardine ..	1
A Geological Pot Pourri, by B. Dunstan	43
Origin and Significance of the Deep Sea Fauna, by Professor E. J. Goddard	47
Queensland Highways, by J. R. Kemp	56
Geographical Discovery as a Basis of Territorial Right, by Dr. F. W. S. Cumbrae-Stewart	61
The Theory of Gravitation, by Professor H. J. Priestly	79
Anniversary Address, by His Excellency Rt. Hon. Sir Matthew Nathan	89
Proceedings of the Royal Geographical Society of Australasia, Queensland	101
Annual Summary, 1922-23	102
Contributions—	
(*a*) The Great Barrier Reef, by Professor H. C. Richards and C. Hedley	105
(*b*) Place Names	110
Provincial Branches	117
The Thomson Foundation Medal Awards	118
Diplomas of Fellowship	119
Foundation Members	120
Members, List of	121
Honorary and Corresponding Members	135
Conditions and Privileges of Membership	Page 2 of Cover
The Thomson Foundation Gold Medal, Conditions of Award and of Competition	Pages 3 and 4 of Cover

ROYAL GEOGRAPHICAL SOCIETY,

LONDON.

CONDITIONS OF FELLOWSHIP.

The Royal Geographical Society, London, our parent Society, is desirous of increasing its fellowship with those anxious to further the promotion and diffusion of geographical knowledge by their interest and support as well as with those able to take a more active part in the work of discovery and exploration. The entrance fee of the Society is £5, annual subscription £3, and candidates have to be proposed and seconded by Fellows. Members of the Royal Geographical Society of Australasia, Queensland, desirous of becoming members of the Royal Geographical Society of London should communicate with Dr. J. P. Thomson, Honorary General Secretary of the Queensland Society.

Queensland
Geographical Journal

No. 24. New Series. 1923. Vol. XXXVIII.

THE PHYSIOGRAPHY OF THE LOWER FITZROY BASIN.*

By F. Jardine.

INTRODUCTORY.

The region described is the lower valley of the Fitzroy River and its tributaries, extending from what is known as The Gap, to Keppel Bay. This embraces an area of about 1,500 square miles.

Primarily it was proposed to confine the examination to the locality of Rockhampton, but an investigation of the topography there indicated that a broader study of the locality would be more fruitful physiographically.

A detailed examination of the whole area was impossible under the circumstances. Considerable areas of dissected country occur, shown in a very general way on the block diagram (Fig. 5). To show the delta formation, approximate bathymetric lines have been added to the map (Fig. 7) from soundings shown on the admiralty chart.

Previous Literature, &c.

Comparatively little has been written, and as far as the writer could ascertain no detailed work has been carried out in regard to the physiography of the Fitzroy. The only publication which refers to the Fitzroy is that by Professor Taylor,[6] in which the series of river captures beyond the Gap are investigated.

For the early history of the area reference has been made to the publications of the New South Wales Historical Society; the

* Communicated to the Royal Geo. Soc. Asa. Qld. by the Barrier Reef Committee, July, 1923.

"Life of Matthew Flinders," by Ernest Scott[13]; the "Early History of Rockhampton," by J. T. S. Bird[14]; and "Gold Mining in Central Queensland and the Mount Morgan Mine," by R. R. Jones.[15]

For information regarding the Geology of the area the writer is indebted to the work of Mr. James Smith, F.G.S., who published the results of his researches in the Rockhampton press many years ago. I have also referred to the "Geology and Palæontology of Queensland," by Jack and Etheridge. All of these have been consulted and quoted to some extent. Other acknowledgments are made in the course of the paper.

GENERAL SURVEY OF THE AREA.

The Fitzroy River, which drains an enormous expense of territory—approximately 54,000 square miles—empties into the waters of Keppel Bay a few miles north of Cape Capricorn, which lies on the tropic of that name.

Rockhampton is distant about 25 miles from the river mouth. The greater part of the town is situated on the flood plain of the river. On the left bank the flats gradually slope up to the foothills of the Berserker Range, which rises to 1,600 feet above the city, a few miles to the north.

The western side of the town is flanked by the Athelstane Range, a low eminence of 200 feet extending for about 3 miles.

The river valley is enclosed by the coast Broadsound Ranges on the north, the Pointer-Black-Moonlight series (breached) on the west, and the Razorback-Westwood series on the south.

A considerable area of the broad Fitzroy valley becomes inundated when the river floods its banks. Rising from the silt plains are a series of rounded knolls, flat-topped residuals, and isolated peaks.

Across the plains the river meanders leisurely, but in time of flood, which occurs not infrequently during the monsoonal rain season, a current of 7 miles per hour is attained. A vast quantity of silt is carried down, and considerable damage by flood erosion is effected along the banks.

In this belt 48 miles broad the general trend of the river is from north-west to south-east, and its length 100 miles approximately.

DISCOVERY, EARLY SETTLEMENT, AND ECONOMIC DEVELOPMENT.

Friday, 25th May, 1770, 10 a.m.—"Haul'd round a point of land which I called . . . ." So runs the entry in Captain Cook's private log.

The point of land Cook called Cape Capricorn, from its situation almost directly under the Tropic of Capricorn. He passed between the mainland and a small island (later named "Hummocky" by Flinders), and on 26th May, "anchor'd having land in a manner all round us." The bay and islands he named in honour of Admiral Keppel, afterwards First Lord of the Admiralty.

Cook seems to have been somewhat anxiously searching for a suitable harbour in which to careen the "Endeavour," for on 27th May he sailed north, after having some difficulty with shoal waters.

On 21st July, 1802, Matthew Flinders set out in the "Investigator" to explore the north-east coast, Torres Strait, and the eastern side of Carpentaria. He was accompanied by the "Lady Nelson," a smaller vessel, but she proved rather a hindrance, and was sent back in October.

On 7th August Port Curtis was discovered and named after Sir Roger Curtis, Admiral at the Cape, who had rendered assistance to the "Investigator" on her voyage out from England. Flinders passed north and entered Keppel Bay. Here the "Lady Nelson" carried out exploration work—not without difficulty, on account of shoals. Arising from a slight embarrassment, our first knowledge of the aborigines of the locality is gained.

The master's mate and a seaman became bogged in a mangrove swamp, and passed the night persecuted by clouds of mosquitoes. In the morning the natives took them to a fire and fed them on wild duck. Natives were encountered at every landing place, and were invariably friendly.

Flinders discovered the narrow passage, "The Narrows," between Curtis Island and the mainland, but there is no record of his having observed the Fitzroy mouths. Mount Larcom, a prominent peak to the south, was named in honour of Captain Larcom, R.N.

In 1824 a penal settlement was established at Brisbane, and later, in 1846, an attempt was made to found a new settlement, to be called North Australia. The attempt was hardly successful, but

the spot is marked by the present flourishing town of Gladstone, named after the Rt. Hon. W. E. Gladstone, Secretary of State for the Colonies at that time.

On 1st October, 1844, Ludwig Leichhardt set out from Jimbour Station (Darling Downs) to proceed overland to Port Essington on the North Coast.

In the course of his exploration Leichhardt crossed and named the Dawson River (after Mr. R. B. Dawson, Black Creek, New South Wales), and the Peak Downs. The Mackenzie River was discovered on 10th January, 1845. This he named after Sir Edmond Mackenzie, then a New South Wales squatter. From here he crossed on to, and named, the Isaacs, then a dry river bed.

On his return Leichhardt essayed the guess to the Archer family that the Dawson and Mackenzie joined to form a large river running into the sea north of Port Curtis.

Charles and William Archer set out in 1853 to examine the possibilities of the country further east than that traversed by Leichhardt. They proceeded from their station, in the Burnett district, to Rannes station, then the most northerly settlement. They reached the Dee River, and eventually the northern part of the Crocodile Creek Range. From this outlook the broad Fitzroy valley was observed, but the stream itself was not seen. The descent from the plateau was made at Razorback, and the party climbed Table Mountain. From this point a large freshwater lagoon was observed and named Gracemere. Next day the Fitzroy—so named after the Governor of the Colony, Sir Charles Fitzroy—was reached, about 13 miles above the rock bar.

The country was inspected and the Archers selected 1,250 square miles; the brothers returned, and in 1855 a start was made to establish a settlement at Gracemere. The party consisted of fourteen Europeans, four native police and their gins, and four Burnett blackboys. The head station was finally established at Gracemere, with a flock of several thousand sheep.

The first vessel on the Fitzroy was a small cutter, the "Elida," brought by Colin Archer from Maryborough with provisions. Later it was utilised to carry wool to Gladstone for shipment south.

Mr. W. H. Wiseman, Chief Commissioner of Crown lands for New South Wales, while inspecting the land applied for by the

Archers, was shown the rock bar across the Fitzroy, and the flats below. He suggested that the site was favourable for a town, and that a suitable name for the town would be Rockhampton.

The Archers were closely followed by other settlers, and in 1857 the town of Rockhampton was officially proclaimed.

In 1857 gold was discovered at Canoona, about 40 miles to the north-west of Rockhampton, by one of the station hands. The ground proved to be fairly rich, and diggers from New South Wales, Victoria, and even New Zealand flocked to the area. The gold was quickly exhausted, but the miners continued to arrive, until there were about 10,000 camped on the flats where Rockhampton now stands. Much distress prevailed, and eventually the Governments of New South Wales and Victoria sent relief vessels.

After this rush many of the better-equipped miners settled in the district. Good reports of the western country by Leichhardt, Mitchell, Gaden, and Mackinlay induced many to select land.

Gold and copper were discovered on Peak Downs in 1862, and it was thought by many that Yaamba, at the head of navigation, would assume some importance, and hence settled there. Their hopes, however, did not materialise.

The subsequent history of the area is largely bound up with the discovery of gold. In 1865 gold was discovered at the head of Gavial Creek, and in a short time there were about 2,000 miners on the field. In 1869 a find was reported at Cawarral, 12 miles to the north of Rockhampton. Here a nugget of 247 oz. was unearthed.

In the meantime gold was being sought for in the Dee Ranges. This culminated in the discovery of Mount Morgan in 1882. It is scarcely necessary to enumerate each discovery. Gold has been found in every direction round Rockhampton within a circle of radius 40 miles.

The first immigrant ship to Central Queensland was the "Persia," 1,600 tons, which arrived at Gladstone on 16th November, 1861, with 454 passengers and immigrants. The "Eutopia" was the first immigrant ship to Keppel Bay. This vessel arrived in the Bay on 6th November, 1862, with 324 immigrants.

The economic development of the area is not without interest, for it illustrates rather well the industrial evolution of a new land. The early settlers were sheep-farmers. Sheep were gradually displaced to the more arid western lands by cattle. During the

transitional period, great activity in gold-mining occurred, which led to the founding of townships, somewhat spasmodically distributed, many of which later were completely abandoned. Then followed a period when general agriculture assumed importance. The pastoral industry became more specialised, and a great increase occurred in the number of dairy farms.

The present stage is marked by the development of the coal resources of the district—the Dawson Valley and Styx River coalfields—and closer agricultural settlement, with the successful inauguration of the cotton-growing industry.

The district includes both tropical and sub-tropical areas, and its development, in view of the controversy in Australia regarding our tropical lands, is of great interest.

THE GEOLOGY OF THE AREA.

The Rockhampton district has not yet been geologically surveyed, and hence it is proposed to give only a broad general outline of the geological formations.

The area forms part of that large belt including most of the eastern highland region of Queensland, which is made up largely of what has previously been regarded as Permo-Carboniferous sedimentary rocks.

In this series, at the Training Wall Quarry a few miles below Rockhampton, on the Fitzroy, *Lepidodendron australe* occurs. At Crow's Nest, near Mount Morgan, in the same series, trilobite carapaces have also been found. Thus the beds are to be more correctly regarded as Carboniferous, probably belonging to the Star series. Professor David[1a] has correlated the coral limestones of Lion Creek, of Stanwell, and the Training Wall Quarry beds, with the Burindi beds of New South Wales.

Limited areas of newer formations occur, the whole being intersected by a complex series of basic and acidic igneous rocks. As elsewhere in Australia, the Carboniferous series here is characterised by intrusions of granite, quartz porphyry, and allied rocks on a large scale.

The Carboniferous Series.

The beds of the Carboniferous series have been considerably puckered into a series of synclinal and anticlinal folds. The general strike of the beds is a N.N.W. one, and the dip is a fairly constantly steep one, the maximum being about 73°.

A series of limestone beds are developed between Rockhampton and Yaamba, on both sides of the river. Some of these have abundant crinoid and coral remains. Associated with the limestones are a series of laminated shales, argillaceous and ferruginous, with sandstones and grits. In places these beds have been hardened to cherts and quartzites. In both shales and sandstones abundant fossil remains occur. On the left bank of the Fitzroy, a short distance below Etna Pocket, slaty rocks approaching phyllites occur.

In the area frequent reversals of dip are met with, indicating repetitions of outcrop at the surface of the various beds of the series, brought about by the erosion of the folded strata.

At Mount Etna, about 5 miles east of Yaamba, an inlier of what is probably Devonian (Burdekin) marble occurs. From these beds Rands[1b] has collected two species of corals—*Heliolites porosa* and *Favosites gothlandica.*

On the low foothills of the Berserkers sandstones and shales occur with the general N.N.W. strike and dipping to the S.W. On the opposite side of the river the Athelstane Range rises 200 feet out of the flats. It consists of a succession of thin laminated shales, cherts, grits, and sandstones. The beds strike N. 32° W., and dip towards the N.E. at 72°. Thus Rockhampton lies probably on a synclinal trough.

Between Lakes Creek and Nerimbera, on the foothills of the mountains, a series of brownish and pinkish shales occur, striking N. 40° W. and dipping to the S.W. at 28°. These are fairly soft and crammed full of *Fenestella* and *Protoretepora.* On an horizon slightly above the Fenestella beds, in the Thozet's Creek basin, a fine-grained siliceous sandstone occurs, which consists of a mass of what may be infilled annelid tubes. This bed has been traced in loose boulders on the Athelstane Range, the Gracemere ridges, and at Kabra, to the south-west of Rockhampton.

In the upper basin of Moore's Creek, Berserker Ranges[2], Mr. C. C. Morton has reported beds of porphyritic andesite, and above these a series of highly jointed dark clay slates and sandstones dipping to the S.W. at angles from 30° to 70°.

The details of the Berserker Range structure are unknown. In the course of a rough traverse on the western slopes of Mount Archer no sedimentary rocks were met with above 400 feet. The rocks were of the nature of rhyolites with well-marked flow structure,

andesites, and tuffs. The southern slopes of the mountain are fairly gentle, while on the northern side vertical bluffs occur. This may be some indication that the flows dip towards the south. Near the railway station at Lake's Creek, in the foothills, beds of breccia and basalt occur, with a general strike of W. 31° S. and dipping towards the N.W. at 27°. These beds lie apparently between the Fenestella and the Annelid beds of Thozet's Creek.

Mr. James Smith, F.G.S., who had collected extensively in the Rockhampton district some years ago, stated that—

> "In the Berserkers there are the most magnificant sections crowded with fossils, sloped at an angle of 30° . . . measuring across the face of that slope with the intercalated beds 1,000 feet or more thick. The fossil beds are six in number, ranging from 3 inches to 14 inches thick. The other beds are brownish or yellowish indurated sandstones and shales, and one thick excoriated basaltic bed which may be a submarine lava stream.
>
> "In the six fossil beds cirripedes occur, and the beds seem to lie unconformably on the Permo-Carboniferous strata. In the highest beds the cirripedes are 12 inches long, and in the lower beds dwindle to mosquito larvæ size."

In the course of several excursions on to the Berserker Ranges such a section was not observed by the writer.

(?) Ordovician beds have been traced along the coast from Yeppoon to Emu Park. Two or three miles south of Yeppoon there are bluffs of a coarse quartzite, with a general north and south strike and intersected by dykes of felsite.

North Keppel Island, off Yeppoon, is composed of shales and greywackes, largely intersected by dolerite dykes (Jack), and containing green turquoise.

In the vicinity of Mount Morgan fossil collections have proved the beds to be of Carboniferous age. Here the stratified rocks are considerably metamorphosed by intrusions of granite, dolerite, and numerous dykes. The rocks are mainly fine-grained sandstones, shales, and bluish quartzites. Occasional beds of serpentine occur. The strike and dip of the beds are generally obscured. Neerkol Creek, near Stanwell, has also yielded fossils of Carboniferous age.

Westwards, beyond the Boomer Range, the Carboniferous formation is overlain conformably by the Dawson Valley coal measures (Lower Bowen, Permo-Carboniferous).

The Upper Bowen Permo-Carboniferous Series.

From Stanwell, a small township on the Central Railway about 15 miles south-west of Rockhampton, a narrow tongue of Upper Permo-Carboniferous rocks extends in a N.N.W. direction. These beds have been investigated by Rands[3] and Dunstan[4]. Whether these beds lie unconformably upon the Carboniferous is not known. From the fossil contents the beds are evidently a fresh-water series.

The Mesozoic Series.[4]

Beds of Jurassic age occur along the eastern margin of the State, at Ipswich, Clifton, Gladstone, Stanwell, Rosewood, and Styx River.

At Stanwell beds of this age occupy an area of about 70 square miles. The chief coal-bearing series lie between Stanwell and Bushley. The northern boundary of the beds lies along the Stanwell fault, but there is an extension of the formation further north

Fig. 1.—Sketch Section, Razorback Mountains to Stanwell (*After Dunstan*).

parallel to the Upper Bowen beds. The southern boundary is somewhat irregular, and a narrow neck extends to the Razorback Range near Mount Victoria. Westwards the beds are buried beneath lava flows.

These beds, which have a total thickness of about 700 feet, lie unconformably upon the Permo-Carboniferous beds, which strike towards the north-west and dip to the south-west. The dip and strike of the Jurassic beds varies somewhat.

The Stanwell fault has an approximate east and west trend and hades towards the south. The downthrow movement has been calculated by Dunstan to be of the order of 1,000 feet.

In these beds two seams of coal occur—one 2 feet 4 inches thick, of good quality coal at a depth of 104 feet, and a few feet below this a seam 3 feet 6 inches wide of inferior coal. These seams, as far as the writer knows, have not been worked commercially.

The Upper Cretaceous (Desert Sandstone).

In the Rockhampton district the Desert sandstone is confined to the Mount Morgan plateau and dissected foothill region. A possible exception occurs at the river mouth. This has been described in another section of the paper.

The sandstone is hard, massive, and very gritty, partaking somewhat of the nature of a quartz conglomerate in places. The beds are highly ferruginous at the base, and become whiter towards the top. In the valley of the Dee sections occur, showing the sandstone lying unconformably upon Permo-Carboniferous beds. With few exceptions the Desert sandstone is horizontally bedded. It is of fairly widespread occurrence on the Mount Morgan plateau, giving rise to precipitous bluffs, capping hills, and in the gorges cut by the Dee and its tributaries. Descending from the plateau towards Stanwell the sandstone occurs as isolated cappings on several of the hills—notably Flagstaff Hill, Stanwell, where it lies unconformably upon the Mesozoic series and associated with basalt. In the foothill region only the more resistant ferruginous portions of the sandstone have been preserved.

Recent Formations.

A large area of the district is obscured by recent deposits. The elevated marine muds and flood plain deposits are discussed in a later section. From Gracemere towards Alton Downs the geological formations are hidden beneath rich basaltic soils varying in colour from red to black.

In the valley of Stanwell Creek and around Gracemere extensive areas of silt deposited by the stream occur. In the Hedlow Creek plain there is a great development of red and black basaltic soils, and silt deposits fringe the stream along its whole course.

Igneous Rocks of the District.

A complex series of igneous rocks occur in the district.

Contemporaneous lava flows are developed in the Carboniferous beds, and the system is intruded by granitic and syenitic rocks. Granite and grano-diorite outcrops occur from Westwood down the Central railway line to Gracemere. Further granite outcrops occur in Blackfellow's Gully Creek, a few miles from the Gap; granite also forms a bar across the Fitzroy in the Gap. Along the Mount Morgan-Rockhampton road, quartz-porphyries and granites are also met with.

The age of these rocks has not been determined. Dunstan[1] states that the Gympie beds lies on the eroded surface of the granite. Probably all the granitic outcrops in the district belong to one huge batholith.

Serpentine Belt.

From Cawarral, extending through Mount Etna, Canoona (near Yaamba) and the Gap on the Fitzroy, a belt of serpentine and serpentinous shales occurs. In these latter shales Smith collected an impression of a perforate Spirifer or Athyris (Etheridge).

Tertiary.

In the area a series of "Sugarloaf" mountains are developed—volcanic necks of alkaline trachytic rocks, belonging to that belt which extends from Victoria to Springsure (Central Queensland). These are described in detail later.

During Tertiary times great volcanic activity in the localities of Mount Morgan, Westwood, and Yeppoon occurred, which gave rise to a series of lava flows which were mostly basic. These flows radiated from east and north over the flats between the mountains, and by their decomposition have produced rich soils of great depth.

DETAILED PHYSIOGRAPHY.

The Highlands.

An examination of the various published maps of the area is misleading. Definite mountain chains are delineated, and these have been named as isolated systems, *e.g.*, Berserker, Razorback, Black, Pointer, Flat Top, and Broadmount Ranges.

Actually in the area no mountain ranges, in the generally accepted geographic sense, are met with.

Masses of dissected highlands do occur, and of these the dominating features have been mapped and named.

It is proposed to show that the Rockhampton district is a dissected plateau region.

Geologically the plateau is young, but the degree of dissection shows it to be well advanced physiographically.

Geological formations and structures have played an important part in determining the topography.

The general trend of the Fitzroy is along the strike of the rocks, and the shales, mudstones, and sandstones have readily yielded to the erosive power of the Fitzroy and its tributaries, with the production of the broad lowland areas or mature valleys.

The effect of differential erosion is marked. The general level of the plateau surface is 1,600 feet–2,000 feet, but numerous residuals of varying elevations occur throughout the area; an examination of these minor features shows that they are of the nature of volcanic necks, metamorphosed sedimentary rocks, basalt or sandstone-capped hills.

The Mount Morgan Plateau.

The Mount Morgan region has been described as an area of "towering mountains, frowning crags, isolated peaks, steep slopes, and innumerable gullies." But this is true in part only.

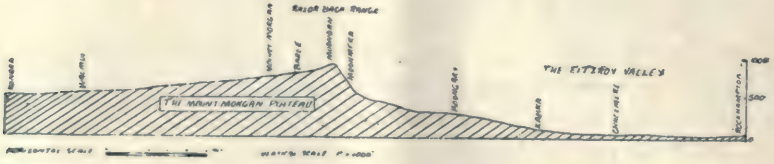


Fig. 2.—Section along Rockhampton-Mount Morgan Railway.

Profiles of the land surface are convenient for demonstrating the physiography. Fig. 1 shows a generalised section from Razorback Range to Stanwell (Dunstan). Fig. 2 is a profile drawn along the Rockhampton-Mount Morgan Railway. From Rockhampton (18 feet) the surface is a gently rising one to Kabra (66 feet), distant 11 miles. Here the dissected foothill region of the plateau is entered, and the grade becomes more abrupt, rising to 511 feet at Moonmera, on the Mount Morgan railway, distant 19 miles from Kabra. Moonmera lies at the foot of the Razorback, which is traversed by a rack railway, one mile in length and rising in this distance 375 feet. From Moongan (886 feet), the terminus of the rack, the slope to the south-west is continuous and gradual, being about 13 feet per mile to Wowan, in the Dee Valley, which lies about 28 miles to the south-south-west of Mount Morgan. The township of Mount Morgan lies in the upper valley of the Dee, at an elevation of 744 feet. An examination of the geological section (Fig. 1) shows similar features.

The scarp of the plateau, or divide between the Fitzroy system

and the Dee-Gogango River systems, is very irregular. Distinct notches have been cut by Stanwell, Gavial, and Station Creeks (tributaries of the Fitzroy), and it is up the notches cut by the first two that the Central and Mount Morgan railways reach the plateau surface.

The scarp—Razorback Range, Dee Range, &c.—merely marks the limit of dissection of the plateau by the Fitzroy system. The dissected region is characterised by the presence of flat-topped residuals, *e.g.*, Table Mountain; about 3 miles south of Kabra, Flat Top at the head of Westwood Creek; volcanic necks, such as Mount Hay 2 miles south of Wycarbah, and the Sugarloaf Mountains about 4 miles west of Mount Hay. For the rest it shows the normal features of a dissected plateau scarp.

South of the divide or scarp the plateau is drained by the Dee River and Gogango Creek. The general plateau level in the vicinity of Mount Morgan is about 1,300 feet, and at Westwood about 1,000-1,100 feet.

The headwaters of the streams occupy gorges up to 500 feet deep, and in this region the country is rugged and elaborately dissected. It is in this deeply dissected area that the town of Mount Morgan lies.

However, a few miles to the south, beginning at Yalwal approximately, there is a marked change in the topography. The Dee flows through an ever-broadening open plain—the Dawson Valley agricultural lands.

The Berserker Series.

Under this heading are included the Broadmount, Flat Top, and Berserker Ranges, with the unnamed extensions towards the north-west beyond Yaamba, and towards the north-north-east from Mount Archer. The series comprises a Y-shaped dissected mass lying wholly on the north bank of the Fitzroy. The base of the Y is formed by the Broadmount and Flat Top Ranges. The highest peak in the system is Mount Sliepner, 1,700 feet; this has the appearance of a typical "sugarloaf" mountain, but was not examined.

The Broadmount Range (1,300-1,400 feet), Flat Top Range (1,400-1,500 feet), and Mount Macdonald (1,100-1,200 feet), fringe

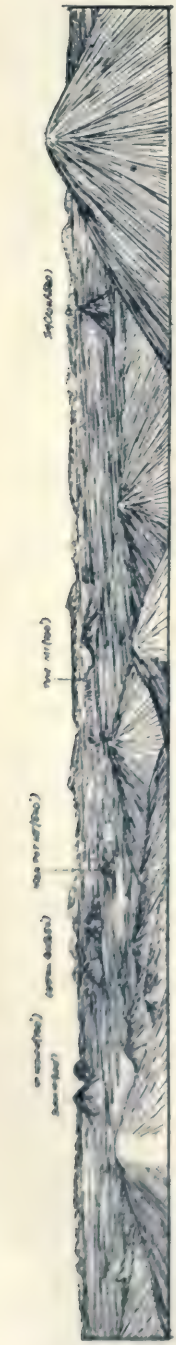


Fig. 3.—Hedlow Creek Valley from Mount Archer.

the left bank towards the river mouth and are isolated from the main complex by the valley of Nankin Creek. As the names indicate, they form a fairly broad flat-topped series of residuals.

The so-called Berserker Range to the north of Rockhampton is an obvious misnomer. It is a dissected mass, made up of a series of high residuals. Mount Archer (1,600-1,700 feet) is a flat top, trending slightly north of east for about 4 miles. Two saddles give it a slightly notched appearance.

To the south-east of Archer a somewhat semi-circular mass occurs. The highest point in this is Berserker (1,500-1,600 feet). The Nicholson mass extends to the north-north-east, and has a general elevation of 1,600-1,700 feet. Of the minor features of the mass little need be said. They are shown in a general way on the block diagram. Towards the north the mass becomes much lower and, in passing, attention might be drawn to the low divide between Coorooman (Cawarral) Creek and Hedlow Creek. From this point northwards there is a marked increase in elevation until the coast range is reached. This mass has the same general elevation as the main Berserker mass. Towards the north-west, also, there is a decrease in elevation, till the broad gap cut by Alligator Creek is reached. From this point the surface rises to the Pointer-Gap series of highlands.

The dissection of the area is well advanced. The Archer-Berserker-Nicholson mass is being attacked on all sides by tributary streams of the Fitzroy. Cawarral Creek is about to breach the northern extension; the north-western extension is being rapidly breached by the north-south tributaries. By the system of captures that will occur a much more economic arrangement of the drainage will be evolved.

The Athelstane Range.

This is a low ridge flanking the town of Rockhampton on the south. It is made up of a series of hardened shales, grits, and sandstones determined by basaltic dykes and apophyses, which traverse its length, off-shoots from the volcanic neck of Rockhampton quarry. The ridge is a low residual of the old plateau surface, preserved by reason of the resistance to erosion of the hardened shales which constitute it.

Gracemere Ridges.

A ridge of similar nature occurs at Gracemere and lower knolls of grano-diorite, no doubt a differentiate from the underlying granite mass.

From Gracemere extending through the Alton Downs region towards Ridgelands a series of low basalt-capped hills occurs.

The Sugarloaf Series.

In the broad Hedlow Creek valley, to the north of the Berserker series, the outstanding feature of the landscape is the series of "sugarloaf" mountains rising abruptly out of the plains (*see* Fig. 3).

The more important of these, with their approximate heights, are—Mount Wheeler, 1,400 feet; Jim Crow, 500 feet; Ironpot, 500 feet; Pine Mountain, 700 feet; Camphill Rock, 650 feet; Black Mountain, 600 feet; Cooberra, 500 feet; Hedlow, 700 feet; Munga Wappa or Wingi Wappa, 500 feet; possibly Mount Sliepner, 1,700 feet, belongs to this series too. Several smaller unnamed mountains occur.

These are obviously volcanic necks which have been exposed by the erosion of the softer surrounding materials. Jensen[5] mentions that—

> "Other alkaline areas do exist in the State, such as the alkaline trachytes of the Yeppoon Range and similar masses in the Springsure and Clermont district."

The series seem to lie along the crustal fracture belt of the Cawarral-Etna-Canoona serpentine belt. The necks are composed of a fine bluish-grey and greyish-white trachyte of a somewhat varying composition. From this cause probably, weathering has given rise to the three types observed.

Camp Hill—Iron Pot Types.

These are almost perfectly smooth hemispherical masses rising directly out of the plain. They are devoid of vegetation, and on account of their convexity absolutely inaccessible.

Jim Crow—Wheeler Types.

These are what might be termed the "horn" type. They are surmounted by a sharp pinnacle. The sides are abrupt, and only with great difficulty scaled. The base is surrounded by a cusp of detrital material, which has fallen from the steep sides. Eventually this type will weather down into a broad cone. The rock is grey, mottled with bluish laths of a ferro-magnesian mineral. Mount Wheeler and Mount Hedlow are both strongly jointed in a north and south direction.

In places these necks are covered by stunted gums and messmate, and on the seaward side pines flourish.

Black Mountain—"Cone" Type.

This is the "broad cone" type. In these the trachyte appears to be of a different composition from the former types, and weathers readily, for the writer was unable to obtain a fresh specimen of the rock, which is characterised by the presence of lath-shaped felspars.

The neck has evidently weathered down rapidly, producing a broad low cone which is covered by dense vegetation.

Other Highlands.

Of the bounding highlands of this part of the Fitzroy basin the Coast Range and the Pointer Range on the north and north-west were not visited. The Black Range and Moonlight Range series on the south-west were not examined in detail. So far as my examination went, none of these masses appear to be true mountain chains, but are dissected residuals of the once-continuous plateau surface.

THE FITZROY RIVER.

General.

The Fitzroy River drains an area of some 54,000 square miles. Over this area the rainfall is somewhat erratic (variability—30 per cent.) (*see* Figs. 15 and 16). On the map (Fig. 14) the distribution of rainfall for 1910 is shown; this may be taken as fairly typical, although the year was a favourable one, for the rainfall was

approximately 30 per cent. above the average for fifty years.

However, accepting that one-third to one-fourth of the rainfall on a catchment area is discharged by a stream, it will be seen that an enormous volume of water has its outlet to the sea by way of the Fitzroy.

With variability of rainfall so there occurs great variability in the volume of a stream, and this reaches a maximum where the rain is seasonal in character. This is the case with the Fitzroy, and following the monsoonal rains of December, January, and February, a tremendous volume of water pours down the river, which floods a very large area from Rockhampton to the river mouth.

Fig. 4.—The Delta of the Fitzroy River.

The Fitzroy with its tributaries occupies a broad valley cut out of a plateau area. Thus it differs from most of the rivers of Eastern Australia, which occupy deep canyons in the uplifted areas. Undoubtedly here the geological formation has been favourable for rapid erosion, and the degree of dissection of the plateau area has reached a more advanced stage. It is proposed to describe typical features in detail, ignoring the significance of each, and in a later section investigate the evolution of the drainage, based on the geological and physiographic evidence.

Barriers Across the River.

The Rock Bar, "The Rocks."

At Rockhampton a barrier extends across the river. This consists of a series of fairly uniform hardened shales of a dark-greenish grey colour, with a few softer beds. The strike varies from N. 12° W. to N. 20° W., and the dip from 55° to 61°. The shales are strongly jointed in a predominating direction of N. 50° E. The secondary laminations dip at 61° towards the west, so that the outcrop is rugged and razor-edged.

On the north side of the river, the outcrop is visible only in the river bed, being buried beneath the alluvium, which composes the river banks, here 30 feet high. The shales continue across the stream in the form of a series of small rock islands and reefs, and outcrop on the south bank, but also become obscured by the silt.

The islands are covered at the higher spring tides. Only one reasonable channel occurs, and this is suitable only for small pleasure craft. This channel lies against the south bank.

For a distance of about 1½ miles above The Rocks the outcrop continues in the form of hidden rock reefs, and the navigation of the river here is fraught with some risk even for small boats.

This rock bar is the effective head of navigation on the Fitzroy for coastal vessels.

Hell's Gate.

The section of the Fitzroy extending from Yaamba to Rockhampton is an extremely fascinating one for the study of river erosion. The illustration of some of these features has been attempted by a series of block diagrams.

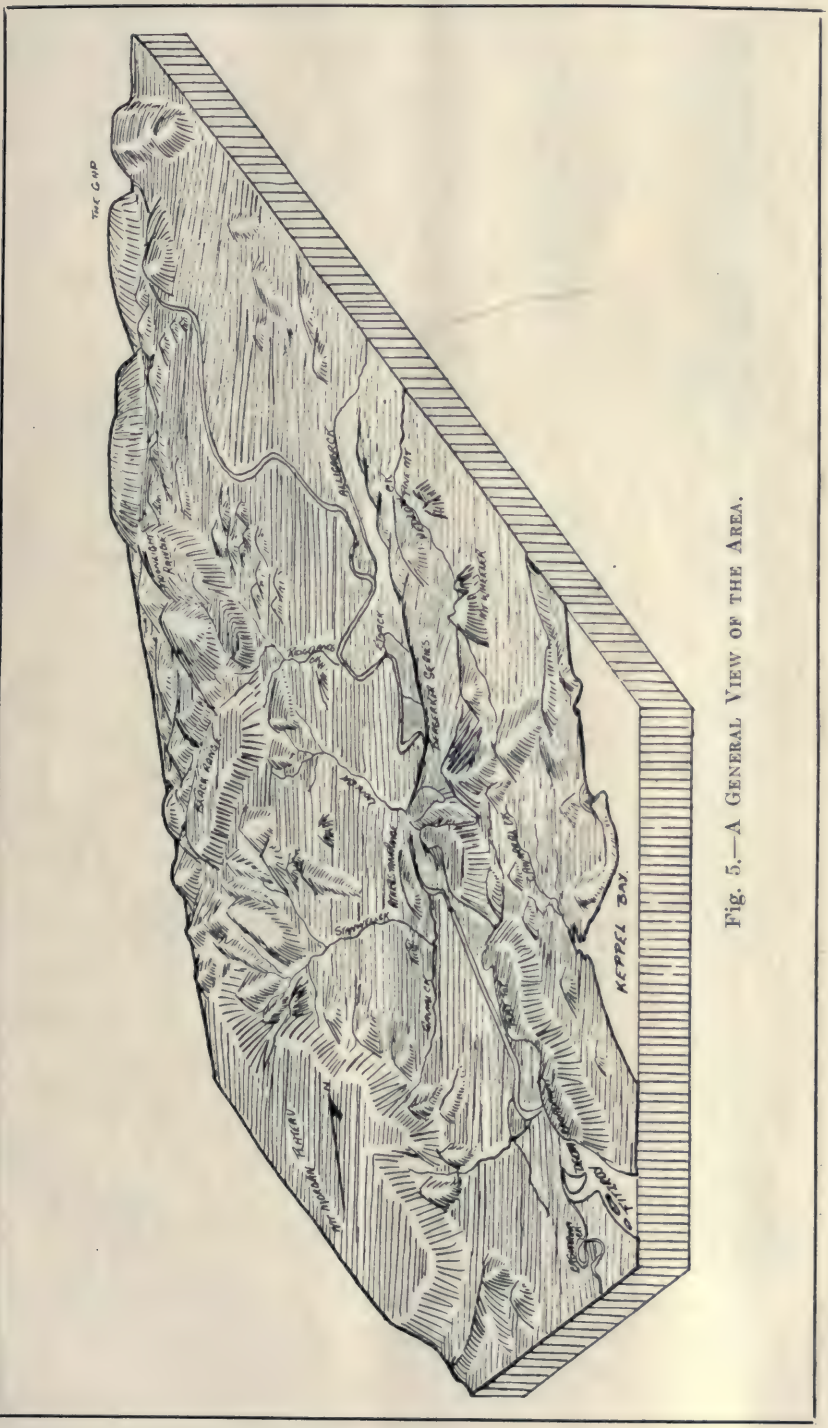


Fig. 5.—A General View of the Area.

Fig. 6.—A General View of the Coast, from Mount Wheeler.

If reference be made to Fig. 9 it will be seen that at Yaamba an elbow bend in the Fitzroy occurs. Across the elbow runs what is termed on the map "the old river channel," now occupied by deep billabongs. The "old channel," which is a flood channel developed by the present stream—joins the river about 3 miles below Yaamba. At Yaamba the river banks are steep, and about 50 feet high, cut out of alluvium. If the flood chart is consulted (Fig. 13) it will be found that here the river rises 50 feet to 60 feet above its normal level.

In time of flood the river, which is richly laden with sediment, bifurcates here. At the point where the two channels rejoin, interference occurs, eddies are set up, and a certain amount of the coarser material, in the form of sand and gravel, is deposited in large banks. Floating trees become snagged on these banks and in the shallows. The resulting accumulations have produced a shallow narrow crossing over the stream. The passage through this obstruction is called Hell's Gate.

The Gap.

This is perhaps the most interesting physiographic feature on the Fitzroy.

Professor Taylor[6] has already drawn attention to the presence of this water gap, and has discussed the series of captures which have occurred, following the cutting through of this old divide, by the Fitzroy.

Travelling upstream from the vicinity of Lake Learmouth the cross section of the valley of the Fitzroy alters. At first low hills fringe the banks on the south side, with a broad area of flood plain on the north, in which Lake Learmouth occurs.

The flood plains diminish on either side, and the river has its course fringed by highlands (800 feet). This passage through the highlands is termed The Gap.

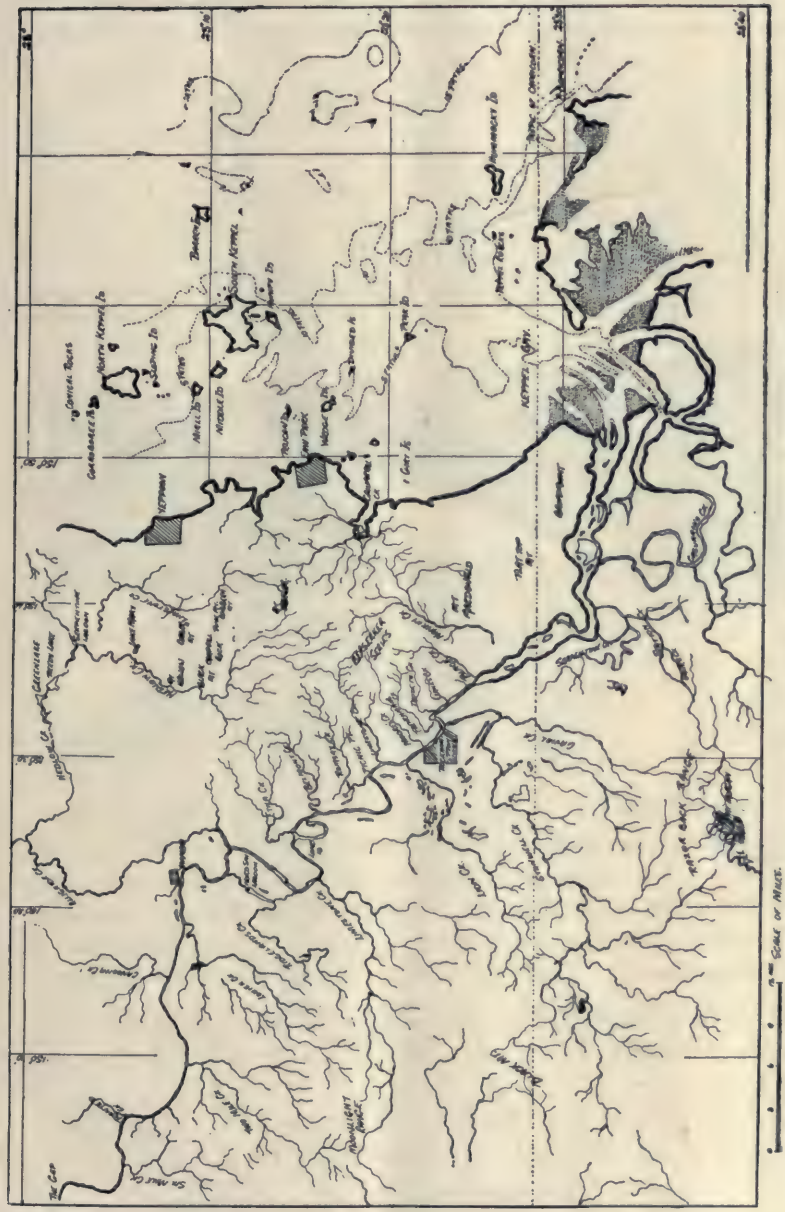


Fig. 7.—Sketch Diagram of the Lower Fitzroy Basin.

Here the river has a winding course through a dissected highland mass which it has completely breached. The highlands extend away southwards to the Moonlight-Black series, and northwards towards the Coast Pointer series. A cursory examination of the geology on the south bank showed the main mass of the highlands to be composed of serpentine, fairly rich in veins of common opal. Towards the base of the hills, at the river level, doleritic and basaltic rocks occur, but their relations were not determined. About 1 mile below the junction of Six-Mile Creek with the Fitzroy a mass of hornblende granite is intruded into the doleritic rocks. Here a rock barrier of granite extends across the river, over which the

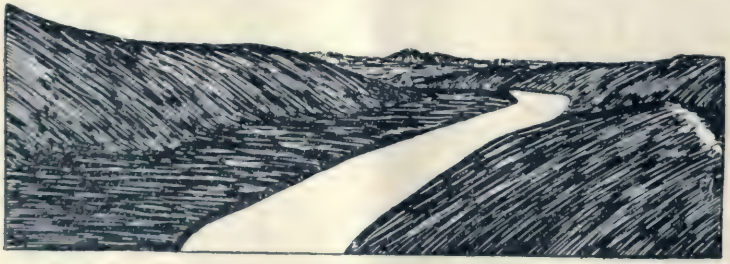


Fig. 8.—General View in the Gap, showing Flood Plains.

stream falls for 10 to 15 feet by a series of shallow rapids. The bed of the stream is strewn with granite boulders, some of them 20 feet x 15 feet x 20 feet.

About 5 miles down stream a further series of smaller rapids occur. Above the rock bar, and extending through the Gap, there is a fine reach of water extending for about 8 miles. The region is rather inaccessible, and in the time at the writer's disposal he was unable to examine the area further to the west than is shown on the block diagram.

The river gorge has been widened by the swinging of the stream, and fairly restricted flood plains occur on either side throughout its length (*see* Fig. 8).

The Valley and Flood Plains.

The Elevated Sea Bottom—Evidence of Uplift.

From the Gap to the river mouth the estimated fall of the river is in the vicinity of 30 feet. Below the rapids the grade is about 1½ inches per mile, and from Yaamba to the mouth the fall 1 inch

per mile. For purposes of comparison, the Amazon has a slope in the lower 500 miles of $\frac{1}{8}$ inch per mile, the Volga slopes at the rate of 2 inches per mile, and the Colorado 7.7 inches per mile.[7]

The Fitzroy on its lower course is thus approaching senility. The flow of the stream in the lower 50 to 60 miles is masked by tidal effects. The river occupies a broad open valley which has been largely reduced to base level. The plateau residuals and the bounding plateau scarps are being actively attacked by the tributaries. A large number of these are dry during the drier parts of the year, but during the wet season they are torrential in character and are active agents of erosion. In the headwater region of the Fitzroy the divides are being actively eroded, and an enormous volume of water laden with silt is swept down from the Dawson and Mackenzie Rivers. The cumulative result is that the Fitzroy becomes heavily over-burdened with sediment. As it has already reached base level in its lower course it becomes an aggrading stream.

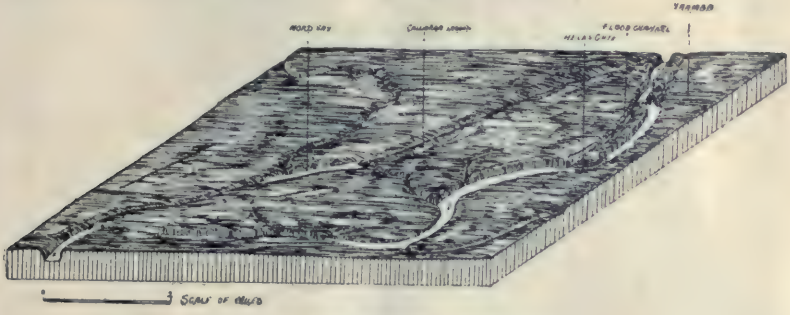


Fig. 9.—The Fitzroy at Yaamba.

With increase in volume during the wet seasons the river sometimes attains a velocity of 6 to 7 miles per hour. This increased eroding power is exercised in a lateral direction in the unconsolidated flood plains on either side of the channel. In the quieter backwaters, where the river spreads beyond its channel, considerable deposition of silt occurs.

From the Gap downstream the Fitzroy is fringed by more or less continuous strips of flood plains, which have their maximum development on the south side of the stream. The north bank is fringed by the Berserker series of residuals.

At Rockhampton there is a sudden expansion of the flood plain area into a broad triangular plain, extending to the coast as far

north as Cawarral Creek, and south to the foothills of the Mount Morgan plateau. In 1918 the largest flood on record occurred, and this lowland was practically a continuous sheet of water.

The analogy between the topography of Townsville and Rockhampton has been pointed out by Professor Taylor, with the suggestion that the flats of both localities might be of the nature of elevated sea bottoms. Mr. E. C. Andrews[8] has also drawn attention to the presence of extensive flats along the Queensland coast.

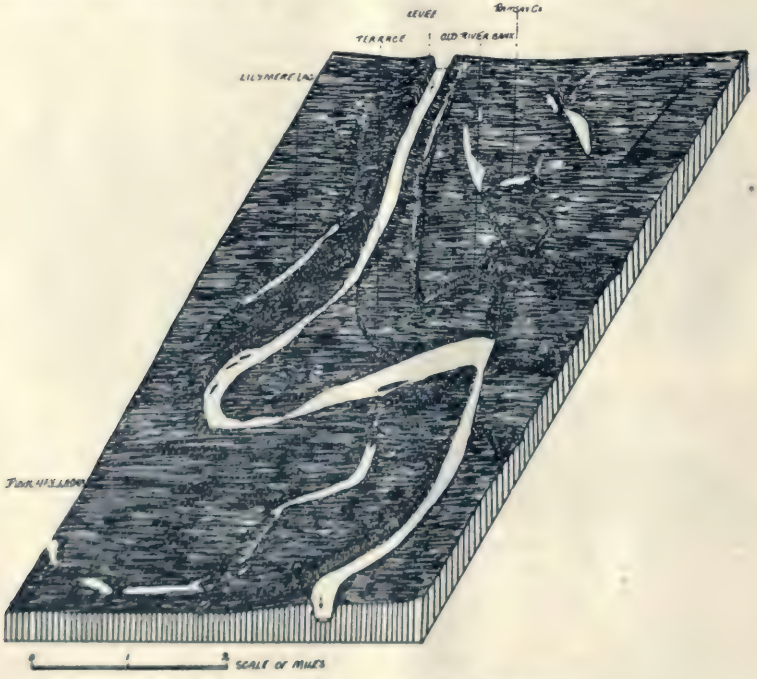


Fig. 10.—The Fitzroy at Picnic Point.

The unconsolidated silts in the locality of Rockhampton attain a depth of at least 30 feet to 40 feet. In places they are clayey in nature. While searching in the silts for traces of marine life, about 1 mile below Lake's Creek and well above high-water mark, the writer found five curious fossils. Two specimens of these were forwarded to the Queensland Museum for identification. I was informed by the Director (Mr. Longman) that—

> "The specimens could not be associated with any named material now in the Museum, and that they were being handed over to Mr. Bryan, a specialist on the honorary staff, for further research."

Search was made frequently in the silts for traces of marine life, but with success only on the one occasion, although the marine muds in places are apparently favourable for the preservation of fossils.

However, from this and the evidence of elevation which is adduced later it is reasonable to assume that Keppel Bay at one time extended westwards as far as Rockhampton, and the present boundaries of the flats from Rockhampton to Keppel Bay represent the outline of the old bay-head. The salt pans of Cawarral Creek no doubt represent a smaller indentation of the bay. It is impossible to differentiate between the redistributed muds brought down by the Fitzroy, which silted up the head of the bay, and the recent flood-plain silts which are being deposited on the elevated bay-head silts.

Evidence of Elevation of the Sea Bottom.

At the river mouth Mackenzie Island occurs. This is a small wedge-shaped island, with the apex directed upstream. The apex is a low projection of volcanic rock of the nature of a rhyolite. The island is low and flat, consisting of sandy soil, fringed by mangrove marshes. On the seaward side the Mackenzie sand extends to the north-east. Towards the apex of the island, but standing well back from the shore line, a bold bluff of sandstone 60 feet to 80 feet rises up vertically. The mass is triangular in shape and conforms to the general outline of the island. The north-western and eastern sides of the sandstone are marine cliffs, and in places, particularly on the seaward side, are strongly undercut. At the base of the cliffs abrasion platforms occur. Towards the south the cliff becomes smaller, and the sandstone is finally buried beneath the silt of the island.

On the mainland and directly opposite, 200 or 300 yards away from the shore line, a smaller bluff of sandstone occurs, rising about 40 feet out of the silt. At the foot of this, also, an abrasion platform occurs.

The abrasion platforms at the cliff bases are in each case 15 feet to 20 feet above the present high-water mark, indicating an elevation of land, or a negative movement of the sea, of the order of 15 to 20 feet. This movement is indicated along the lower Fitzroy. Well marked terraces occur, and the river is entrenched 20 feet to 30 feet in the flood plains (*see* Figs. 9 and 6).

On examining the sandstone of Mackenzie Island, and the bluff on the mainland, the writer was struck by the close resemblance

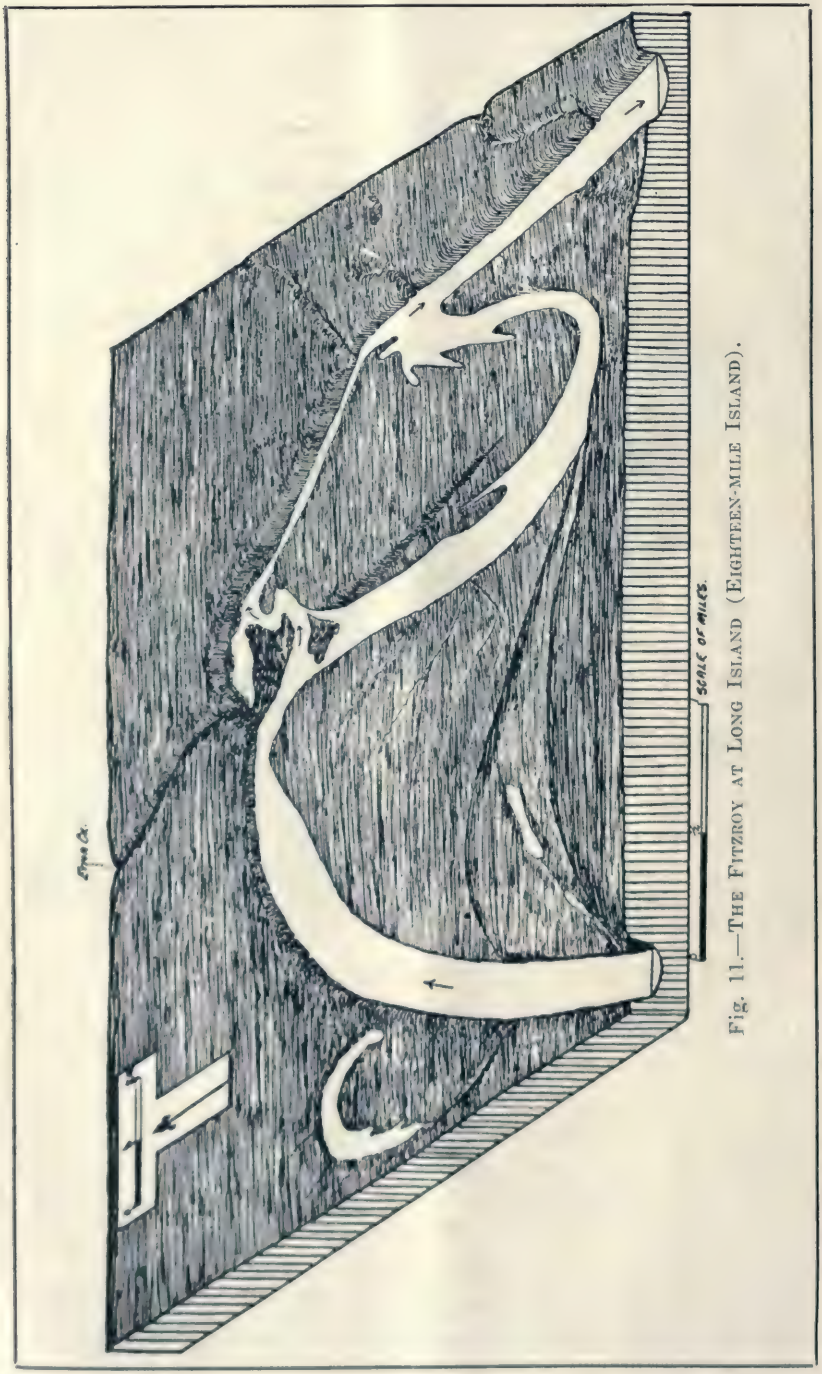


Fig. 11.—The Fitzroy at Long Island (Eighteen-mile Island).

lithologically to the Desert sandstone seen at Mount Morgan and at Flat Top (near Westwood). Smith's description of the Willangi (Desert) sandstone at Broadsound shows that to be almost identical. The occurrence, too, is similar, for the Willangi sandstone rises from the silts of the former extension of Broadsound. A characteristic feature of the sandstone of both localities is that towards the top the rock becomes whiter, finer grained, and very flaggy. On Mackenzie Island the sandstone is practically horizontal, striking W. 25° S. and dipping at 5° towards the west. The bluff on the mainland gives a dip of 15° to the east, and a strike of N. 20° W. However, the main mass of the sandstone is horizontally bedded.

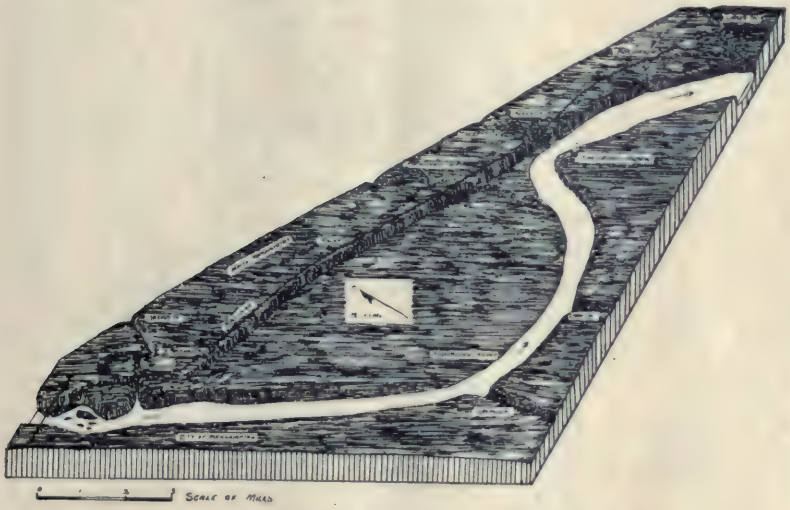


Fig. 12.—The Fitzroy at Rockhampton.

From the lithological character of the rock and the fact that it is unconformable with the Carboniferous series of the district the suggestion is made that it is the Upper Cretaceous, Desert sandstone.

On the island current bedding is finely developed, dipping to the north-west and north. This has some significance relative to the evolution of the Fitzroy.

Erosional Features.

Meanders and Change of Course in the Flood Plains.

It has already been pointed out that the Fitzroy in this area is aggrading its channel, and thus conditions are most favourable

for the development of extensive flood plains, particularly as the river fairly regularly overflows its banks, at such times as it is heavily laden with sediment.

It is scarcely necessary to go into the dynamics of meander formation. The unconsolidated silts of the flood plains are particularly favourable for lateral erosion. It is obvious that deposition, or infilling, actively goes on on one side, while erosion occurs on the other.

The series of block diagrams (Figs. 9, 6, 11, and 12) have been drawn to illustrate some of the features of the meanders of the Fitzroy in its flood plains.

An interesting feature along the Fitzroy, from about Lake Learmouth to Picnic Point, is the development in places of natural levees. These are essentially flood deposits. The waters spread beyond the banks and on leaving the main channel there is a marked falling-off in velocity, with the deposition of the coarser sediment. The finer material is carried beyond, and settles on the flood plain. These slight embankments form a barrier to the minor natural drainage streams, which in some cases become deflected and flow parallel with the river and in close juxtaposition before finding access to the main stream. Again, some are completely dammed, and small lagoons are formed elongated parallel with the main stream and but a few yards from it (Fig. 6).

These lagoons are characteristic of the area mentioned, and are found fringing the river for practically the whole of this distance.

The broadening of the valley laterally, and infilling, is well shown in several localities (Figs. 6 and 12). At Rockhampton a fine example occurs (Fig. 12). The railway line from Moore's Creek to Koongal is along the old river bank. The racecourse, cricket ground, and pasturage reserve are on the infilled area. The river has swung across and eroded on the south bank, which is now about 2 miles distant, and is being actively eroded at the present time.

Fig. 11 illustrates the river at 18-Mile Island (Long Island). Here Etna Creek has been betrunked by the Fitzroy by the development of the meander with the production of this curious feature.

Fig. 8 shows the river at Yaamba and southwards. In the larger flood channel, the Nord Say, one of the finest lakes in the district occurs. It is of the nature of a billabong, into which Ridgelands Creek drains.

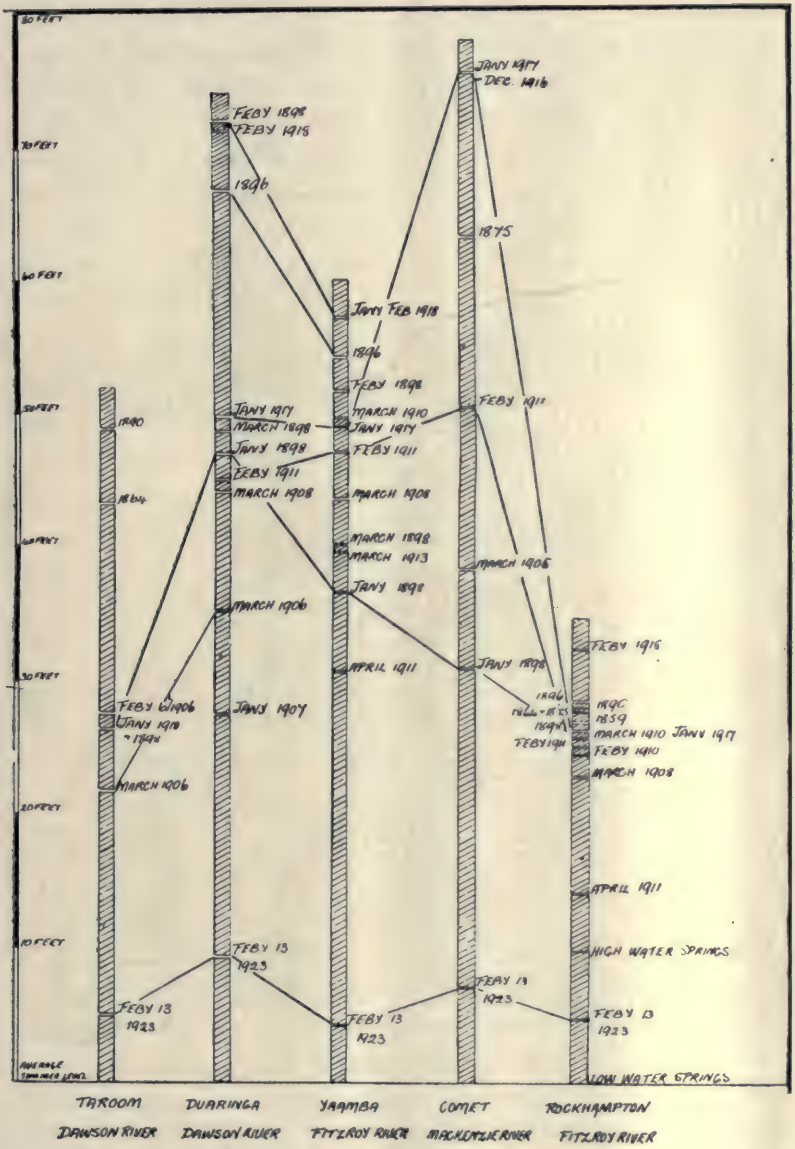


Fig. 13.—Flood Gauge Readings, Fitzroy River (*Commonwealth Meteorological Department*).

The Delta.

In the lower Fitzroy the aggrading of the channel has proceeded to such an extent that it is rather an embarrassment from an economic viewpoint.

In the channel sandspits and mud flats have been deposited, and with the assistance of the mangroves some of these have been consolidated into more or less permanent islands. The deposition of the mud and sand banks has been effective in diverting the stream from one main channel into a series of smaller channels. These are

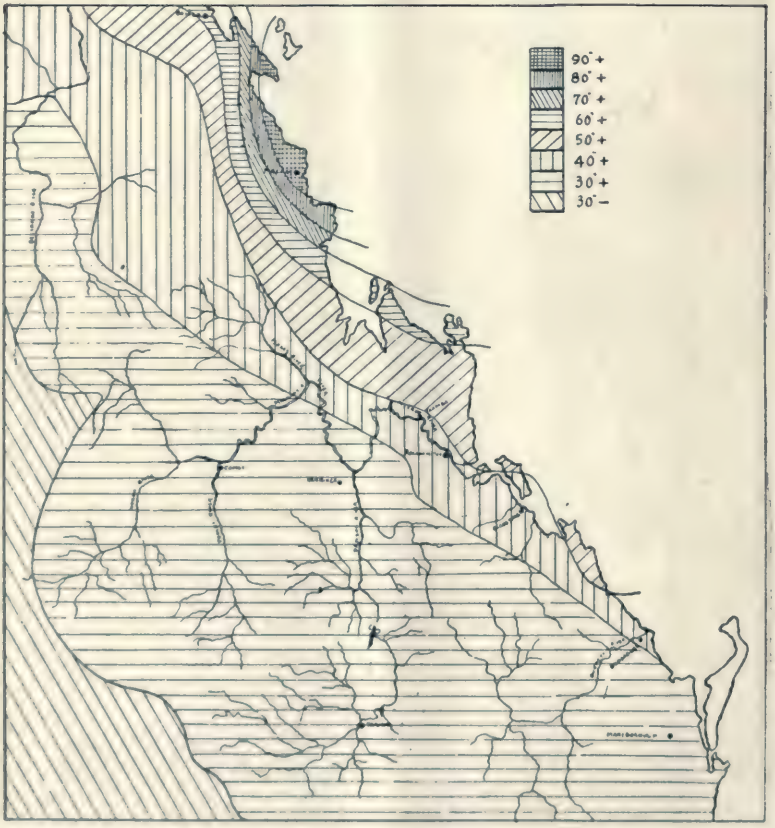


Fig. 14.—Rainfall on Fitzroy Basin, 1910.

ever varying features from flood to flood, for with each scour certain banks are removed and new shoals deposited, and the channels shift in correspondence.

Naturally, as deposition has proceeded, the channel has had to expand laterally to accommodate its waters. Diverging streams or distributaries have been developed in the adjacent flats, *e.g.*, Casuarina Creek, Sabina Passage, and Alligator Passage. In every case the distributaries return to the main stream.

Towards the river mouth the Fitzroy becomes a broad shallow stream. At the mouth two mangrove islands of accumulation occur, Mackenzie and Flat Islands, which cause the stream to divide into three channels as it enters Keppel Bay. From the map (Fig. 13) it will be seen that the deposition of river silt is continued into Keppel Bay in the form of "spits." Both current and wave erosion are effective in shaping this silt, but are unable to remove or redistribute it completely. Thus the channels are able to advance their mouths into Keppel Bay.

D. W. Johnson[9] has applied, to a single channel which advances its mouth in this manner, the term "cuspate delta shore line." The delta of the Fitzroy is of the cuspate type.

The upstream limit of the Fitzroy delta—if the point where the distributaries begin can be regarded as the upstream limit—would occur at the Prawn Sands. Salisbury,[10] however, points out that "it is truer to regard the upstream border of the land reclaimed from the sea by the river deposits as the head of the delta." With this interpretation Rockhampton lies at the head of the delta.

Reclamation by the river has been accelerated by a slight uplift of about 20 feet, which has already been discussed.

The delta lands at the river mouth are low, swampy, mangrove marshes. No definite drainage system has been evolved. The surface is plane, and few streams with definite channels occur.

The Tributaries.

The degree of dissection of the plateau and the overburdening of the Fitzroy are some indications of the expansion of the tributaries. The district is drained by a very complex and minutely branching system of creeks, many of which are dry for a part of the year. The Hedlow-Alligator Creeks and Stanwell Creek are by far the largest of the tributaries. Both are permanent, but Stanwell Creek is much reduced in the drier months.

It is not proposed to discuss the tributaries in detail, but to draw attention to those which are of some importance physiographically. If the map of the area showing the drainage system is consulted, it will be seen that the arrangement of the streams is a very asymmetric one.

Professor Taylor[6] has enunciated the "Law of Physiographic Symmetry"—

> "As a cycle of erosion approaches completion the drainage tends to become more and more symmetrically and economically arranged. Interruptions in a cycle result in loss of symmetry, and palpable asymmetry points to late changes in the cycle."

It is in the south-flowing streams that the greatest asymmetry occurs.

Hedlow Creek rises in the Berserker series, about 15 miles from the coast, and flows north-west, then west, where it is joined by Alligator Creek from the north. The stream then flows south and south-west to the Fitzroy. Rain which falls in the head-water region, 15 miles from the coast, reaches the sea after travelling 100 miles. This is certainly not an economic arrangement. Hedlow Creek is the largest stream which makes a boat-hook bend with the Fitzroy in the area. It occupies a broad mature valley, whose floor has an average elevtion of 50 feet to 100 feet.

Cawarral Creek system is an engrafted series of streams which rise in the northern extension of the Berserker series; these originally drained into a small indentation of Keppel Bay which became reclaimed by the last movement of elevation. The outline of the indentation is given by the salt pans at the creek mouth.

The divide between Hedlow and Cawarral Creeks is low, and is rapidly being breached. Eventually the drainage of Hedlow Creek will be captured by Cawarral Creek. With the breaching of the north-western extension of the Berserker series by the south-flowing tributaries, the Hedlow Creek drainage will be recaptured by the Fitzroy.

Etna Creek, Belmont Creek, and Ramsay Creek make distinct boat-hook bends with the Fitzroy, as also do the smaller creeks rising in the Berserker mass—Limestone, Moore's, Frenchman's, Thozet's, and Lake's Creeks.

Of the tributaries on the right bank Gavial Creek alone, rising in the Mount Morgan plateau, makes a boat-hook bend with the Fitzroy.

Lagoons and Swamps.

On the western side of the Athelstane Range a low, flat, swampy plain occurs, with numerous depressions occupied by lagoons and swamps. These swamp lands continue unbroken to the river mouth.

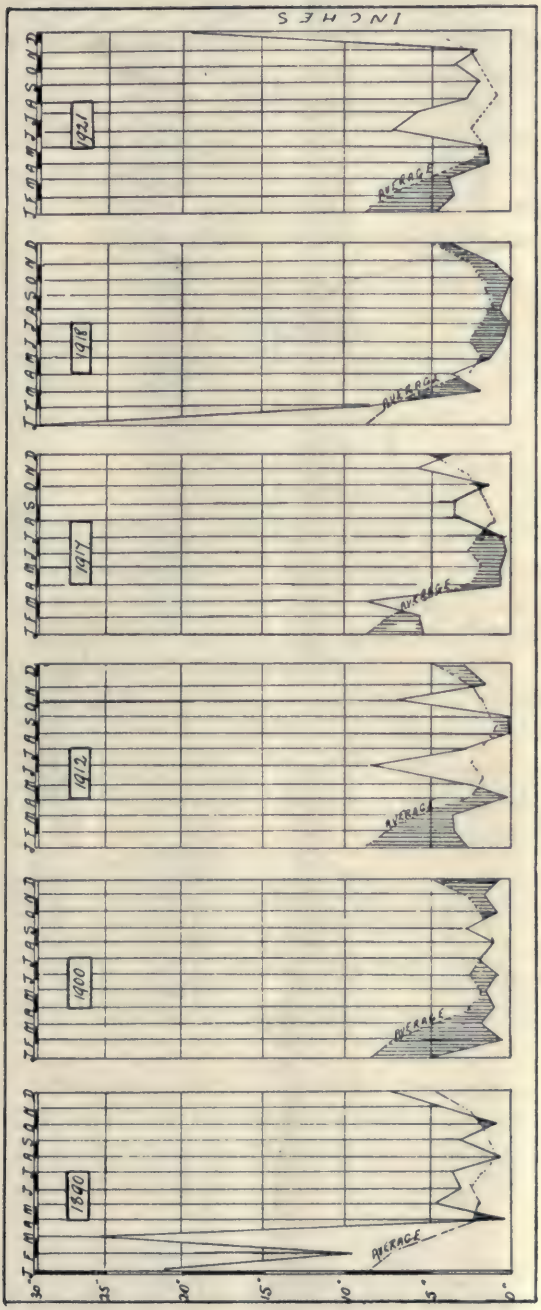


Fig. 15.—Rainfall, Rockhampton, showing Monthly Variations (*Below Average Shaded*).

When the flood waters in the Fitzroy attain a height of 26 feet above normal river level they break over the south bank in the vicinity of Lilymere and Pink Lily, and drain to the sea over the flats to the west of Rockhampton, and thence to the delta swamps. In the course of time flood channels have been excavated, and these are occupied normally by a series of billabongs; notable amongst these are Lilymere, Pink Lily, Crescent, Yeppen, Serpentine, and Frogmore Lagoons. Besides these there are numerous irregular depressions, also occupied by lagoons and swamps.

These lagoons are of some economic importance, for they are the source of the present Rockhampton water supply. As the lagoons become exhausted the supply of water is maintained by pumping underground water from the flats, derived no doubt largely from the soakage from Stanwell Creek, which drains over the area.

The Shore Line.

If a line is drawn through Cape Capricorn, slightly west of north and parallel to the coast line, it will pass through a series of islands—Fairway Rock, 82 feet; Hummocky Island, 418 feet; Humpy Island, 200 feet; Half-way Island; South Keppel, 500 feet; Middle Island, 206 feet; Myall Island, 216 feet; Sloping Island, 202 feet; North Keppel, 300 feet; Corroboree Island, 143 feet; and Conical Rocks. Of these, North and South Keppel Islands are outstanding in importance. South Keppel is the larger (4 miles by 3 miles) and North Keppel is somewhat smaller. The remainder are rock pinnacles.

If another line is drawn through Station Point on Curtis Island, parallel to the coast also, it will pass through a second series of islands, including Arch Rock, 60 feet; Peak Island, 370 feet; Split Rock; Divided Island; Wedge Island, 200 feet; and Pelican Island, 151 feet. These are a smaller series of rock pinnacles.

Close in shore several smaller island festoons occur. South of Emu Park the Entrance Rocks and Round Rock form a small chain running to the south-east—a drowned spur which can be traced on to the mainland. Another small group occurs further south, at the Sandhills.

The shore line of the area is, generally speaking, linear and low-lying, with but few prominent headlands. Abundant evidence occurs of the movement of slight elevation already discussed, which

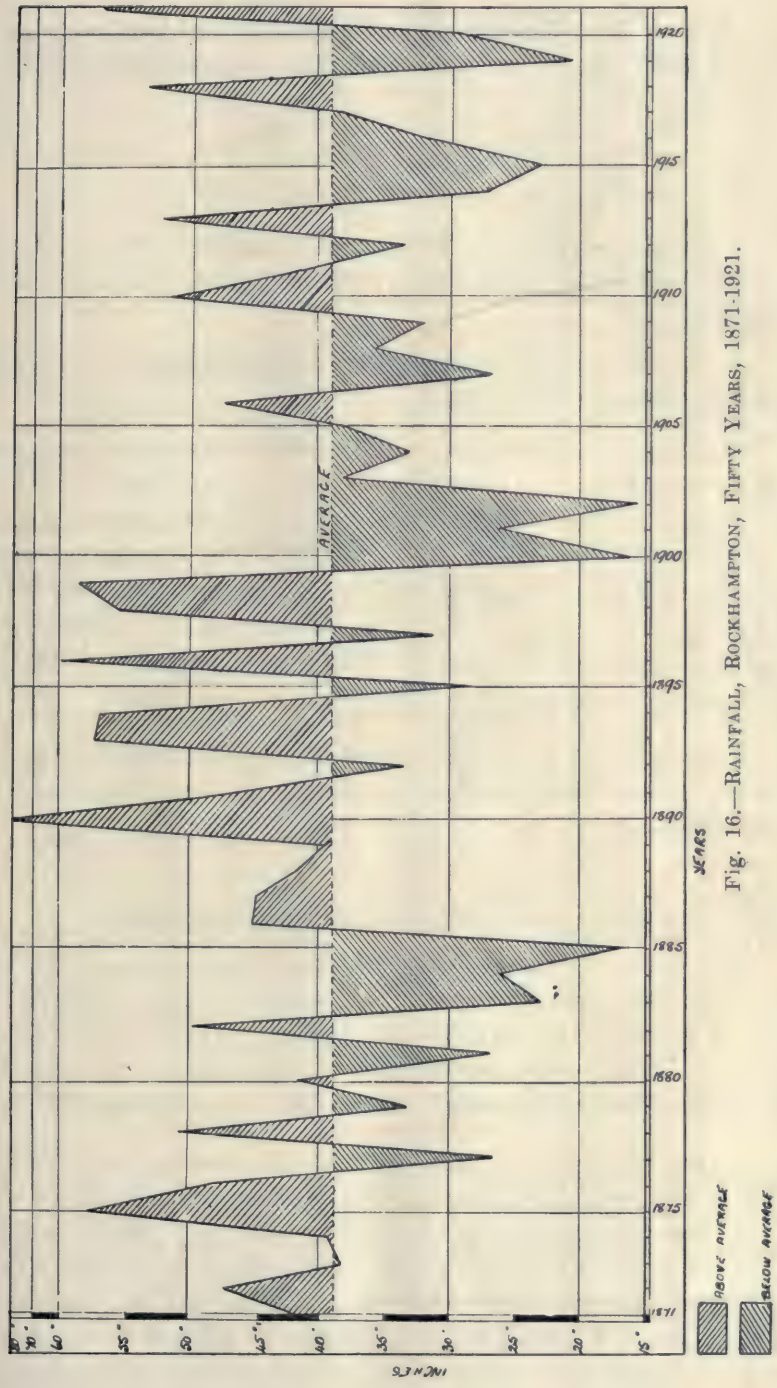


Fig. 16.—Rainfall, Rockhampton, Fifty Years, 1871-1921.

is so general along the east coast of Australia. At Yeppoon, north of The Bluff, the old fascetted shore line occurs now fringed by recent sand dunes.

Physiographically there is little evidence in this area indicating a fault shore line, as it undoubtedly is.

Professor David[11] has shown that a zone of heavy fractures extends from Gladstone to Herbert Creek at Broadsound. He also states that:—

> "There is both stratagraphical and physiographic evidence of this fault at Curtis Island.
>
> "Lionel Ball shows (quoted by Professor David) that there is a basin of Burrum Beds (Trias or Trias-Jura) thrown against Devonian rocks. The Boyne River follows this line of fault, which presumably throws to E. 40° W. The channel between Curtis Island and the mainland is a continuation of this fracture. Beyond Keppel Bay it seems to divide, an eastern branch going to Shoalwater Bay and the Northumberland Island, the western branch to the estuary of Herbert Creek at Broadsound."

The islands of Keppel Bay no doubt are relics of the former eastern extension of the continent, which has been stepped down below sea level.

The Evolution of the Fitzroy Drainage System.

The history of the evolution of the Fitzroy drainage can be traced back to Cretaceous times. The current bedding in the sandstone of Mackenzie Island shows that the material was derived from highlands, which extended to the south-east beyond the present shore line. The drainage was from the east into the Cretaceous sea.

At the beginning of Tertiary times an elevation of the land surface occurred, which raised the Cretaceous sediments above sea level. That the precursor of the Fitzroy continued to flow towards the west is demonstrated by the preservation of many of the tributaries of this old stream—Gavial, Hedlow, Etna, Belmont, Ramsay, Moore's Creeks, all of which make boat-hook bends with the present Fitzroy.

The movement of elevation, apparently, continued slowly, and the stream was gradually entrenching itself in the rising plateau. About Miocene time, probably, the movement of elevation ceased, and there ensued a long period of erosion, when a fairly mature valley with numerous residuals was evolved.

At the close of Pliocene times East Australia became warped up to the present plateau level. Associated with this warping heavy faulting occurred, which resulted in the drowning of the old shore line and the production of the broad continental shelf. This was the period of the Port Curtis fault, and the Keppel Islands are the relics of the down-thrown eastern extension of the land.

Associated with these movements there was a period of great volcanic activity, and lava streams were poured into the valleys of the streams.

This late Tertiary movement of uplift appears to have been fairly rapid, for the course of the river was reversed and it now drained eastwards from the Gap divide (a residual or series of residuals in the old valley). A further drowning of the shore line occurred, and Great Keppel Bay came into existence. Into this the Fitzroy drained.

The Gap divide was eventually breached by the Fitzroy, and the capture of the Dawson and Mackenzie Rivers followed.

This series of captures has been discussed by Professor Taylor.[11]

The Fitzroy was rapidly silting up the narrow bay-head of Keppel Bay when a negative movement of the ocean occurred of about 20 feet. This added considerably to the old shore line, and it is to this last movement, in many cases, that the characteristic flats of the eastern shores of Queensland are due.

This last movement[12] occurred in very late times; possibly it is going on at the present time.*

ECONOMIC BEARING OF THE PHYSIOGRAPHIC FEATURES.

Communications.

The area is traversed by a fairly complete network of railways, which is confined largely to the broad valley bottom. It has already

* *Note by Editor, Q.G.J.*—Additional information is given on this matter by Mr. B. Dunstan in Queensland Geological Publication No. 190 (Records No. 1) 1904, under articles "Phosphate-bearing Rocks in the Rockhampton District," and "Notes on the Geological History of Keppel Bay."

been shown that the Stanwell notch, and the Four-Mile Creek notch, have been utilised in railway construction, as they provide fairly easy access to the Mount Morgan-Westwood plateau.

To the north of Rockhampton the Berserker series present a barrier, but the valley of Nankin Creek provides a passage through the mass to Emu Park and Yeppoon on the coast.

The roads of the area occur generally along the railway lines.

The Fitzroy is spanned by two bridges at Rockhampton. The railway bridge (Alexandria) is a massive iron-framed structure which spans the river at the rock bar, which has proved a convenient foundation for the massive masonry buttresses. The Fitzroy bridge occurs about three-quarters of a mile down stream, and is of the suspension type.

Floods and Navigation.

In previous sections the question of floods on the Fitzroy has been fairly exhaustively dealt with. Fig. 13 shows the levels of the various floods which have occurred on the Fitzroy, and some correlation may be made with the rainfall graphs (Figs. 16 and 15). It is hardly necessary to point out that a flood plain is not the most desirable location for a city on account of the damage, loss of life, and disorganisation of communications which occur when the plain becomes inundated.

The narrow gorge of the Gap acts as a "safety cock" for Rockhampton during flood times.

In time of flood the waters spread out in a huge lake above the Gap, through which a torrent 60 feet deep roars. It thus prevents the sweeping down of huge volumes of flood waters, which would be disastrous in the lower reaches.

The Fitzroy is navigable for vessels of about 1,500 tons as far as Rockhampton, which is the head of navigation for coastal vessels. Larger ocean-going vessels discharge and load at either Port Alma or Broadmount, at the river mouth.

The navigation of the stream as far as Rockhampton has been made possible by the construction of training walls (not yet completed), which tend to concentrate all the conflicting streams such as the flood and ebb scours, and the lines of flow of the upland waters, into a single channel; the lines of the training walls have to be

carefully laid down and diverge gradually from the head of the delta to the river mouth. Dredging work is necessary from the outset to increase the tidal scour.

In the map (Fig. 4) the delta is shown. The positions of the completed training walls are inserted, and by means of dotted lines the proposed walls are indicated.

Water Supply and Conservation.

In 1875 a pumping plant was installed to draw the supply of water for Rockhampton from the Crescent, Dunganwheate, Murray, and Yeppen Lagoons. The lagoons still furnish the water supply of the city, which is highly unsatisfactory, as there is not a sufficient quantity of water available, and the quality is bad.

A scheme for drawing the water supply from the river, above the tidal influence, has been adopted, and arrangements are well advanced for putting this scheme into operation. It is proposed to draw the supply from the river bed at Yaamba, transport it along the higher left bank to Kent's Hill, a few miles north of Rockhampton, and from there gravitate to the city. By this means an abundant supply would be available (2,000,000 to 2,500,000 gallons per day) for many years. The river water is soft, free from organic matter, mineral salts, and noxious bacteria. Special provision will be made for the removal of silt in time of flood.

SUMMARY.

Geology.—The dominating formation of the district is the Carboniferous series of rocks, consisting of shales, mudstones, sandstones, grits, and limestones. The beds have a general strike N.N.W., and dip rather steeply up to 73°. The system has been puckered into a series of synclinal and anticlinal folds. Contemporaneous lava flows and intrusions on a large scale of granite, quartz porphyry, and serpentine occur. In the vicinity of Stanwell limited areas of Permo-Carboniferous sediments and Mesozoic coal measures are developed. The Mount Morgan plateau is capped in places by the Upper Cretaceous Desert sandstone, which lies unconformably on the Carboniferous beds. That this capping was once continuous is demonstrated by the fact that in the dissected foothill region of the plateau flat-topped residuals with cappings of Desert sandstone

occur. In the broad Hedlow Creek valley a series of "sugarloaf" mountains occur—trachyte necks belonging to that series of alkaline necks described by Jensen as being probably of Eocene age.

Physiography.—The lower Fitzroy occupies a broad mature valley cut out of the later Tertiary plateau, which is of general occurrence along the eastern seaboard of Australia. The Fitzroy differs from other rivers of East Australia in that it does not occupy a canyon in the uplifted area. Undoubtedly here the geological formation has been favourable for rapid erosion. The river has its course along the strike of the rocks, and in the lower 80 miles has practically reached base level.

The district is drained by a minutely branching system of tributaries, which are active agents of erosion, being torrential in character during the wetter months of the year. A tremendous volume of water is carried down from the Dawson-Mackenzie system (the Fitzroy drains approximately 54,000 square miles), and the cumulative result is that the Fitzroy becomes overburdened, and in its lower course is an aggrading stream. Thus there occurs an extensive development of flood plains, meanders, levees, and the usual associated features.

Where the river empties into Keppel Bay an extensive delta formation occurs, of the cuspate type.

In the silts at Lake's Creek, fossils, as yet unidentified, were found. On Mackenzie Island, at the river mouth, sea-cut cliffs and abrasion platforms occur, now 15 feet to 20 feet above high-water mark. At Yeppoon, north of the Bluff, a facetted shore line occurs, now fringed by dunes about 20 feet above the present high-water level. Thus a greater Keppel Bay once extended as far west as Rockhampton (the flats from here to the river mouth represent the old outline of the Bay), which became silted up and reclaimed by what was probably a negative movement of the sea of the order of 20 feet.

The valley is bounded on all sides by a dissected mass of highlands, relics of what was once a continuous plateau surface. To the south the Mount Morgan-Westwood plateau slopes away to the south-west. On the west the Black, Moonlight, Gap (breached), Pointer series occur, and on the north are the Coast-Broadsound series.

Rising from the valley floor numerous residuals occur. Of outstanding importance are the Berserker series, a Y-shaped mass extending from Broadmount on the river mouth to beyond Yaamba and northeast to the coast. This series includes the Broadmount, Flat Top, Berserker, and Nicholson Ranges. Smaller residuals occur in the valley which are of the nature of basalt and sandstone-capped hills, volcanic necks, and hardened shales.

The drainage of the area is very asymmetric; Hedlow, Etna, Belmont, Ramsay, Moore's, Frenchman's, Thozet's, and Gavial Creeks all make boathook bends with the Fitzroy. The precursor of the Fitzroy drained to the west. The early movements of elevation, apparently, were gradual, and the river was able to maintain its course. Later the movement became more rapid, and a reversal of drainage occurred. The river drained from The Gap highlands into Greater Keppel Bay. Following this the divide became breached, and the Dawson-Mackenzie systems were captured. These captures have already been investigated by Professor G. Taylor. By a negative movement of the ocean a large part of Keppel Bay was reclaimed.

Associated with the movements of elevation the eastern extension of the land was faulted down below sea-level. Professor David has drawn attention to the Port Curtis fault, extending along the Boyne Valley to Broadsound. Relics of the old land surface occur in Keppel Bay in the form of two parallel chains of islands—the outer chain includes North and South Keppel Islands; the inner is made up of rock pinnacles.

AUTHORITIES.

1*a*. Sequence Glaciation and Correlation of the Carboniferous Rocks of the Hunter River District, N.S.W., C. A. Sussmilch and Professor T. W. E. David, Proc. Royal Soc., N.S.W., 1919.

1*b*. Olsens and Johannsens' Caves, near Rockhampton. W. H. Rands. By Authority, 1892. (Geol. Surv. Publication.)

2. Examination of Dam Sites and Catchment Areas on Moore's Creek, Rockhampton. C. C. Morton, 1922.

3. Annual Progress of Q'land Geolog. Survey, 1891. By Authority, Brisbane, 1892.

4. Mesozoic Coal Measures of Stanwell and Associated Formations. B. Dunstan. By Authority, 1898. (Geol. Surv. Pub.)

5. The Alkaline Rocks of S. Queensland. B. A. A. S. Jensen, 1909, p. 250.

6. Physiography of E. Australia. Bulletin No. 8. T. G. Taylor, 1911.

7. College Physiography, R. S. Tarr and L. Martin. Macmillan and Co., New York, 1914.

8. Preliminary Note on the Geology of the Queensland Coast, with References to the Geography of the Queensland and New South Wales Plateau. E. C. Andrews. Proc. Linn. Soc., N.S.W., 1902, XXVII., pp. 146-185.

9. Shore Processes and Shoreline Development. Douglas Wilson Johnson. John Wiley and Sons, 1919.

10. Physiography. Collin D. Salisbury. John Murray, London, 1907.

11. Notes on Some of the Chief Tectonic Lines of Australia. Professor David. Journ. Roy. Soc., N.S.W., 1911, XLV., pp. 4-60.

12. The Geology and Palæontology of Queensland. Jack and Etheridge. By Authority, 1891. *See* "Evidence of Elevation of the Queensland Coast in Tertiary Times." (Geol. Surv. Pub.)

13. The Life of Matthew Flinders. Ernest Scott. Angus and Robertson, Sydney, 1914.

14. The Early History of Rockhampton, by J. T. S. Bird. "Rockhampton Bulletin" Office, 1904.

15. Gold Mining in Central Queensland and the Mount Morgan Mine. R. R. Jones. "Morning Bulletin" Office, Rockhampton, 1913.

A GEOLOGICAL POT POURRI.*

By B. Dunstan, Chief Government Geologist.

[In introducing the lecturer the President said:—

Geology is not a part of Geography, but it is very closely related to it. Both the form and the covering of the earth's surface are very much subjects for geographical examination and discussion, and they mainly result from the action of geological forces metamorphosing, disintegrating, and agultinating the materials of which the world is made. Possibly less allied to Geography are those parts of Geology that deal with the distribution of minerals in the earth's crust and with the occurrence in it of the remains of the forms of life from which present plants and animals are variations embodying the long results of time. But these several parts of the science, which is not Geography but is related to it, are very much related to each other and, when the Council were offered by an old and valued member a pictured pot pourri dealing with them all, they most willingly accepted. Mr. Dunstan scarcely requires introduction by me. I am sure he has been listened to on former occasions with pleasure by many in this room, while others who have not heard him speak will have read the learned and useful notes that, as Queensland's Chief Government Geologist for over twenty years, he has prepared on some of the matters about which he will tell us this evening. It is more than twenty-five years ago since he, a Victorian, came to Queensland from New South Wales. This is a very fitting course of migration for men of science, and an example which we shall always be glad to see followed. I believe such men are greatly valued here, and as our University spreads its activities over the land will constantly be more so.]

The lecture consisted of a review of a number of geological, mineral, and mining subjects of local and general interest, illustrated by a large number of coloured sections. The principal subjects discussed were the Geological and Mining Features of the Gympie goldfield, the coal mines and the Marine Cretaceous beds of the Maryborough district, the Mineral Developments about Biggenden, the Occurrence of Fossil Insects at Ipswich, and Some Notes on the Great Australian Artesian Basin.

In the introductory remarks references were made to recent modifications in the Queensland Geological Record, and to the geological time scale and its application to Queensland formations, and on the screen were shown a number of diagrams and coloured maps and plans in illustration of the general geological features of the State. The underground structure of the Brisbane district and geological features between Brisbane and Ipswich were described

* Abstract of an address to the Royal Geographical Society of Australasia, Queensland, 24th April, 1923.

and illustrated by coloured sections, and other plans and sections were shown descriptive of the artesian areas in Western Queensland and South Australia.

The geological features of Gympie were explained in some detail, and lantern slides were used to demonstrate the mode of occurrence of gold in the quartz reefs on this goldfield. Particulars were furnished regarding the presence of graphite or plumbago in the slates, and an explanation was given of the action of this mineral as a gold precipitant where it came in contact with the reefs, and also on the effects of the manganese in preventing gold from being precipitated.

Black slate (containing carbon) is a good indicator of gold in the reefs, while purple slate (containing manganese) is an indicator that wherever it comes in contact with the reefs the latter will be barren. The plumbago in the slate must be absolutely in contact to be effective, and a mere film or layer of clay between the quartz and the plumbago is quite sufficient to prevent the precipitation being effected.

It was shown amongst other features that only reefs dipping west in easterly-inclined country were gold-bearing, and if the dip of the reefs changes to east and that of the country changes to west, gold will be absent. Gympie mining therefore must be carried on very systematically before success is assured. The series of beds in which the reefs exist is made up mostly of volcanic fragmentary material, from which the gold in the reefs has been leached.

Some notes were given about maganese-bearing country to the south and west of Gympie. At Kandanga and Amamoor large lodes of manganese-dioxide are to be observed, and exposures show that in this part of the district such lodes exist in great numbers and of various sizes and forms. The drawback in the development of the deposits is the absence of a very fine quality of ore, but nevertheless the quality is sufficiently good for a number of uses. Better quality ore, it is hoped, will be revealed as the densely-timbered country hereabouts is cleared, the manganese belt being of enormous extent.

One of the principal features about the geological history of Maryborough is the occurrence of a very interesting belt of Cretaceous rocks in a number of places containing abundance of marine fossil shells. These fossils are to be observed specially

in the Corporation Quarries, near the railway in a volcanic tuff matrix, and although many of the fossils have been described and figured in the literature of the Queensland Geological Survey, others have recently been discovered quite new to science. Extensions of these marine beds have been examined at Woody, Duck, and Fraser Islands, at Pialba, Urangan, and in the country to the west of the Coal Measures at Howard. At the last-mentioned locality the beds containing the fossils are used as a geological horizon in defining the trend of the lower portion of Burrum Coal Measures, and miners know fairly well the position of the lowest coal bed when the outcrop of the marine beds at the base of the coal measures can be defined.

The Mount Bopple graphite deposits are in the Tiaro Coal Measures and below the horizon of the Cretaceous Marine beds. The mineral has been formed by the contact of coal seams with intrusions of a volcanic rock. The graphite, or plumbago, is amorphous, abundant, and in being somewhat impure is of limited commercial value.

Fraser Island is covered almost completely with Tertiary and recent sand deposits, but the trend of the Coal Measures and Marine deposits on the mainland indicate that a possibility exists of coal being found on the Island below the sand accumulations, and areas have been examined with a view of fixing sites for boring if it were found desirable to prospect for coal in this very convenient locality.

Biggenden, in the Burnett District, west of Maryborough, is the centre of a mineral-bearing area, and three large low-grade mining propositions in the area have been considered to have some prospective value as a source of mineral wealth. These mineral propositions are the Ban Ban zinc lode, the Mount Shamrock gold mine, and the Mount Biggenden bismuth mine. All are of large dimensions, will require to be worked on a large scale, and costs will require to be very low, but the Mount Shamrock gold deposits in which values exist in volcanic tuff, breccia, dioxite, and mudrock, and the Biggenden bismuth lode in magnetite, with gold as an accessory, must develop sooner or later into important metal-producers.

Denmark Hill at Ipswich has received a deal of attention from geologists and entomologists because of the wonderful variety of fossil insects which have been discovered there. They occur in a shale bed only a few inches thick, and, judging from the observed

geological features, were destroyed and entombed under abnormal conditions. The bodies of the insects are almost invariably found to be broken up or destroyed, while the wings and elytra have been beautifully preserved. The most abundant species of the fossil insects belong to the Coleoptera, but cockroaches were very plentiful, these two groups representing about 75 per cent. of all that so far have been unearthed.

The coloured slides shown at the lecture were specially prepared to illustrate the geological structure of the reefs and formation at Gympie, of the mineral-bearing lodes at Biggenden and Shamrock, and of the Coal Measures and Marine beds at Maryborough, while many others were used to illustrate the forms and pecularities of the fossil insects at Ipswich and the conditions under which they were preserved.

The lecture was concluded by the following reference to Mining Morality:—

> "The future success of Gympie mining rests on a better understanding between employees and employers, and between labour and capital. Also must there be absolute confidence between the speculative public and those controlling mining operations. Unless these conditions can be brought about the future prospects of Gympie will not be bright, notwithstanding the undoubted presence of gold-bearing reefs having distinctly promising features."

THE ORIGIN AND SIGNIFICANCE OF THE DEEP-SEA FAUNA.*

By E. J. Goddard, B.A., D.Sc., Professor of Biology, Queensland University.

[In introducing the lecturer the President said:—

It is my pleasing duty to introduce to you this evening Professor Goddard, who has recently taken over the very important Professorship of Biology in our Queensland University. As my own acquaintance with Professor Goddard, which I hope will in time become intimate, is at present but slight, I must confine myself to telling you what his public reputation and his professional colleagues have told me. He is a Doctor of the Sydney University, and for two years held the important Macleay Fellowship in Natural Science of the Linnean Society of New South Wales. While holding that fellowship he took part in the capacity of Naturalist in an expedition to Fiji, and rendered material assistance in the geological investigations which were its main object. In 1910 he went to Stellenbosch, in the Cape of Good Hope Province of South Africa, as Professor of Zoology and Geology. The versatility indicated by his selection for this Chair is emphasised by the fact of his being, I understand, an expert botanist and an experienced investigator in oceanography and meteorology. For a dozen years he remained in South Africa, making for himself a great name in scientific circles in the Union, where he originated a Zoological Survey. He has published a large number of papers and treatises on natural science subjects ranging from the Australian Foraminifera to Antarctic exploration. His high scientific attainments are thus beyond question, and he is said to have the further powers of being able to help those desirous of gaining knowledge that are derived from being a good speaker, able to present interesting facts in clear language and logical sequence. The facts that he has to put before us this evening, though not primarily geographical, have no doubt an influence on the configuration of the earth's surface, now and in the future, which justified the Council in extending the strict boundaries pertaining to the Society's work so as to include an address of such great interest and so attractive in form as we anticipate will be the lecture that I now invite Professor Goddard to deliver.]

Of the many problems associated with the biological aspects of oceanographical research, there is none of greater interest to the scientist than that concerned with the nature and origin of the deep-sea fauna. This interest is not bound up exclusively with the intrinsically biological aspect of the problem, but takes into account, also, philosophical considerations bearing on wider issues, such as

* An abridged account of a lecture delivered before the Royal Geographical Society of Australasia, Queensland, 27th May, 1923.

that of Oceanogenesis, &c. It is for this reason that such a lecture can be justified before an audience constituted by members of a Geographical Society.

In order to appreciate the nature and significance of the Deep Sea Fauna, it is necessary that we should always keep in mind the physical factors which in every way govern the existence of this fauna. We know so little about organic evolution, so little bearing on the mechanism of the relation of the organism to its environment that this procedure is to be recommended more and more to all forms of biological research, and particularly where the problems of distribution are concerned. Zoologists stand more in need of this advice than botanists, who have long recognised the importance of Ecology. If we are to advance Natural History studies as science we must depart more from the purely descriptive and avoid more often purely convenient and arbitrary conclusions.

The dismissal of widely occurrent convergence in evolution and the acceptance of many land connections as explanatory of present distributions, whereas such merit the status of "possibles" and not even "probables," are cases in point where the arbitrary and convenient has ousted the scientific attitude.

In making observations at the surface of the sea, excellent results in respect of physical data can be obtained by employing the ordinary methods and apparatus available for physical and meteorological investigations. In deep-sea research, however, direct observations at depths are impracticable, and so we have to depend for much of the requisite data on sinking instruments and appliances. Obviously progress in this branch of oceanographical research has been dependent to a very large extent on the development of mechanical aids. A comparison of the apparatus employed on the Challenger Expedition with that used by a recent expedition will illustrate to what extent progress has been dependent on the evolution of such mechanical aids to work.

In deep-sea investigations it is necessary that we should have a knowledge of sea depths, temperatures at various depths, chemical character, salinity, density, viscosity at various depths, compressibility, and pressures at various depths, of the sea water, sunlight penetration, horizontal and vertical circulation of oceanic water, and the nature of the bottom.

As in analogous investigations on land, it is advisable that we should have some idea of the contour of the sea bottom. In the present state of our knowledge it is possible for us to form a good general idea of that surface, as conveyed in the following table:—

Depth in fathoms.	Area in square miles.	Percentage of ocean floor.
0—1,000	22,000,000	16
1,000—2,000	27,000,000	19
2,000—3,000	81,000,000	58
3,000—4,000	9,000,000	7
4,000—5,000	195,000	Less than 1
Exceeding 5,000	5,000	Less than 1

Areas exceeding 3,000 fathoms are generally termed "Deeps," and of such there are fifty-seven—thirty-two in the Pacific, eighteen in the Atlantic, five in the Indian Ocean, and two in the Southern Ocean.

There are two deeps in the Atlantic and seven in the Pacific with depths exceeding 4,000 fathoms. Depths exceeding 5,000 fathoms are restricted to the Pacific.

In considering the distribution of life forms on a bathymetrical basis it is necessary to delimit sub-oceanic regions. The mean depth of the oceans is 2,080 fathoms, and the mean height of the land 375 fathoms. If the higher portions of the continental elevations were removed to the oceanic depressions, the depth of the ocean would then be about 1,700 fathoms, and this depth is termed the "Mean Sphere Level." Bordering the great ocean basins there extends around each continental mass a continental shelf reaching from the shoreline for an average distance of fifty miles, its seaward edge being on the average at a depth of 100 fathoms. It has been estimated that there is about 10,000,000 square miles of continental shelf. Passing seaward from its outer edge—the continental edge—we traverse the continental slope, which extends down to the mean sphere level, and is estimated to cover an area of about 30,000,000 square miles. Beyond this depth (1,700 fathoms) we pass to the abyssal plain, which is estimated to cover an area of about 100,000,000 square miles or more than half of the earth's surface. The steepest gradients occur on the continental slope, but even these do not exceed those of our roads and railways.

For the purposes of this lecture we are here concerned with those life forms which pass their existence beyond the continental

edge. If we imagine the gradually shelving plane of the continental shelf to be continued seawards, we find on investigating marine life that this imaginary plane is so placed in regard to such important physical factors as light-penetration and viscosity, &c., that it serves as a boundary of the greatest significance. This plane has received the name "Artificial Bottom," the area above this being termed the "Photic Zone," and that below the "Aphotic Zone." The position of the artificial bottom has been broadly indicated above in a way that will enable us to connect the shallow-water life zones with those of the deep sea, but this position is not to be adopted too rigidly or too literally. For example, we will find that the limt of the photic zone is deeper at the equator than in higher latitudes. The limit of light penetration is reached somewhere between 600 and 900 fathoms. Visible rays penetrate to a depth of over 3,000 feet, but even actinic rays do not extend beyond 5,000 feet. Viscosity is a very important factor, especially where we are concerned with floating and swimming forms, as in the open sea. Viscosity diminishes with increase of temperature and increases with increase in salinity, but the latter factor can be eliminated, as far as viscosity is concerned, when we recognise that the common limits of salinity are from thirty parts per thousand to thirty-five parts per thousand.

The following table gives an idea of variant viscosity:—

Temperature.	Viscosity or Internal Friction of pure water at 32 degrees Fahr. is 100.	
	Salinity, 30 per 1,000.	Salinity, 35 per 1,000.
32 deg. F.	102	103
41 ,, ...	87	88
50 ,, ...	75	76
59 ,, ...	66	66
68 ,, ...	58	59
77 ,, ...	52	53
86 ,, ...	47	47

The photic zone is clearly divisible into oceanic and neritic areas, the latter comprising waters with a depth of 100 fathoms, as over the continental platform. Within this neritic area will be found plankton (minute floating plants and animals), nekton (actively swimming forms), and benthos (attached or non-actively swimming animals and plants). Within the oceanic area will occur plankton and nekton. Below the photic zone in this oceanic area

will occur the abyssal plankton and nekton in the intermediate waters, and along the surface of the continental slope and the abyssal plain will be found nekton and benthos.

Oceanic plankton is to be found from the equator to the polar regions, varying in its intensity of development according to surface temperature, salinity, &c. This plankton is the mainstay of marine animal life, whether at the surface or in the depths of the sea, for on its plant constituents (phytoplankton) depend the herbivorous animals, which in turn are the prey of the carnivorous forms. Thus, in the sea, as on the land, animal life is ultimately dependent on plant life, and plankton can be regarded as the pasturage of the sea. It is essential that the importance of this plankton should be thoroughly understood. If the waters of the sea were to suddenly disappear, and the whole mass of its contained life forms precipitated to the bottom, we would view a marvellous scene. We would gaze on a plain covered with a mass of animal forms, the whole practically smothered with plankton. The irresistible impression would be that the sea was very much richer in life than is the land, and this impression would be correct. In the sea, as on the land, there are sterile areas, as we will see later, but if we take equal average areas of land and sea we will find that the yield of the latter is greater than that of the former. If aquiculture were as intelligently studied as agriculture, there can be no doubt that the sea would be more productive than the land. This statement has received ample support from the results obtained in the North Sea, where for years great efforts have been made on an international basis to investigate the potentialities of the sea in respect of production.

The phytoplankton is constituted mainly by various types of algæ, of which the most important are the diatoms and peridineans. The diatoms flourish in greatest abundance where there is an admixture of muddy water from the land and where the salinity is relatively low, as, for instance, off the embouchures of rivers in the Indo-Pacific region, where the largest rainfall in the world occurs, and towards the Arctic and Antarctic regions. In association with this plankton a great part is played by bacteria.

Temperature, salinity, and viscosity in the oceanic area of the photic zone vary with latitude.

Within the photic zone there is a metabolic cycle. The phytoplankton, in the presence of sunlight, is actively engaged in building up protein material which serves as the food for the animal

plankton. Associated with these organisms the bacteria play a very important part in bringing about the disintegration of the dead material, and so serve to replenish the food supply for the phytoplankton.

Surface temperatures and meeting of currents play an important part in conjunction with salinity in intensifying or retarding the activities within this metabolic cycle, and all this is reflected, and we will see, in the strength of development of the bottom fauna.

The fauna of the photic fauna is represented by plankton and nekton. The plankton includes foraminifera, radiolaria, pelagic molluscs, and tunicates, larval forms, &c., but the most important and abundant are the crustaceans such as copepods and amphipods. The stomach of whales is frequently found to be filled with these crustaceans. In the upper part of the photic zone the animal forms are, in general, transparent. As we pass to the deeper part of this zone we find that the fish, for example, are characterised by their colouration—having silvery sides and brown backs. As we reach the lower boundary of the photic zone we will find mostly red forms among the invertebrates as crustacea, and black as the dominant colour of the fish.

One of the most interesting facts about these fishes is the strong development of the eyes and phosphorescent organs, notably in those forms which occur between the 100- and 400-fathom line.

We will refer later to these forms, many of which are capable of great vertical migrations and exhibit great adaptation in respect of floating organs, &c.

The entire pelagic fauna within the limits of the photic zone is to be regarded as an entity quite distinct in origin from the bottom forms of the abyssal plain and the continental slope.

Along the continental edge—that is, the junction of the continental shelf and continental slope—there is a great feeding ground termed the "mud line," where the finer deposits from the land and the remains of oceanic plankton mingle. This "mud line" can be imagined as extending more or less horizontally seawards (it really becomes deeper as we pass towards the ocean) on the one hand to form the "artificial bottom," where thrive the forms to which we have just referred; and on the other hand down the continental slope and over the abyssal plain, where thrive the dominant forms of the aphotic zone.

Beneath the photic zone we pass to a region where, in the absence of sunlight, there is no trace of plant life; there is a low temperature, viscosity and salinity vary little, the pressure is always very great and becomes excessive with great depths; there is no water movement, and the bottom is covered with soft mud or ooze. It is at the border line between the photic and aphotic zones and within the aphotic zone that the grotesque forms of the deep sea are to be found, and all these find the origin of their peculiar characters in the peculiarities of their environment, the outstanding feature of which is the absence of plant life and the conditions necessary for plant life.

The benthos within this zone lives on the surface of the continental slope and the abyssal plain. Such forms are dependent ultimately for their food on the material which accumulates on the bottom in the form of dead planktonic remains. These types have been aptly termed mud-eaters and scavengers, and on these carnivorous forms prey in turn. Many characteristic members of the deep-sea benthos have long stalks for attachment, as for example crinoids, alcyonaria, &c.; others have long legs. These characters are to be correlated with the soft oozy nature of the bottom. Representatives of forms which in shallow water are provided with massive calcareous skeletons are sparsely represented in the deep sea, or, if present, do not show massive skeletons. The fauna of the continental slope comprises numerous representatives of sponges, worms, crustaceans, alcyonarians, simple corals, pennatulids, sea anemones, holothurians, brittle starfish, starfish, crinoids, echinoids, brachiopods, and molluscs. In contrast to the limited distribution of the forms living in the shallow water of the continental shelf the fishes have a very uniform distribution. There is a relatively greater abundance of individuals and species on the terrigenous deposits bordering on continental land than on pelagic deposits further from the land. The ratio of genera to species rises in a most regular manner as we pass into deeper and deeper waters, more and more removed from the land. The bottom forms, in depths exceeding 2,500 fathoms, include sponges, antipatharians, sea anemones, hydroids, crinoids, starfishes, brittle starfishes, echinoids, holothuroids, worms, molluscs, &c.—in fact, representatives of practically all the groups found in shallow waters—but it is most important to note that many of the fishes and crustaceans which are recorded as having been dredged from certain great depths have really been taken in the intermediate waters between the bottom and the surface. For a long time the development of the eyes in

so-called deep-sea-bottom forms among fishes was the cause of much confusion among zoologists on account of the fact that many of the fishes had enormously developed eyes, while in others the eyes were degenerate. We have now every reason to believe that in all true-bottom forms the eyes are enormously developed, and that these organs make use of the phosphorescent light which is so generally emitted by the abyssal invertebrate benthonic animals.

In the region of the artificial bottom, where the limit of light-penetration is reached—at a depth of about 500 fathoms in tropical regions—there occurs a special assemblage of piscine forms which have been termed bathypelagic forms or twilight animals. Their food supply is ensured by the fact that at this depth there is a sudden change of temperature and salinity, and hence a marked change in the viscosity. This increased viscosity is responsible for arresting the fall of the more superficial plankton, and so at this hozizon there is afforded an excellent feeding-ground. We are all familiar with the phosphorescence of minute pelagic organisms. In the subsurface forms of fishes we find that light organs are developed in those which live between 100 and 400 fathoms. Beyond this depth there is a decrease in the importance of the light organs. The development of the eyes is correlated with the strength of the phosphorescent organs.

In the early days of deep-sea investigations it was thought that there would be found in the depths of the ocean many representatives of forms regarded until then as extinct; in other words, that the deeps would be found to be asylums for the preservations of archaic forms, such as trilobites, &c. Although many interesting forms, such as the stalked crinoids, have been discovered, the anticipations have not been justified.

The fact that there is a marked decrease in the wealth of deep-sea abyssal forms as we move further and further from the land suggests that the fauna of the deep sea is constituted by forms which are to be regarded as the descendants of migrants from the shallow waters. We have drawn attention to the great feeding-ground offered along the mudline. There is every reason to believe that the peopling of the bottom of the abyssal depths has been effected by the gradual migration of forms from the mudline along the surface of the continental slope, which offered abundance of fine mud and abundant remains of plankton. We are justified in

believing that sterile areas in the bottom of the ocean can be correlated with areas on the surface, where there is sterility in respect to planktonic development.

When we recognise the extreme conditions of existence in the great depths of the ocean, we can hardly believe that the bottom fauna of the abyss has been derived by vertical migration of forms from the surface of the oceanic area. The application of physical investigations to oceanographic problems of a biological nature has done much towards explaining the origin of the deep-sea forms by bringing to our notice the existence of such zones as the "artificial bottom."

The migration of forms down to continental slope has no doubt been going on for a very long period, and so by special adaptation to the unique conditions of the deep many forms now long extinct but once inhabitants of the shallow waters have been preserved in the deeps.

Probably the bipolarity of many marine forms finds its explanation in the migration of forms along the continental slope. The further migration of many such forms into the abyss would serve to explain the distribution of many of the abyssal forms.

It is by the application of such methods as outlined in this lecture that we may hope to solve the biological problems—of a pure and economic nature—of the Great Barrier Reef.

QUEENSLAND HIGHWAYS.*

By J. R. KEMP, Chairman, Main Roads Board.

[In introducing the lecturer the PRESIDENT said:—

Commercial Geography is largely the description of communications, and to this extent it is a constantly changing record as means of communication vary on and in the different elements. They start with the bush track made by natives singly or in single file and with the unmarked path of the dug-out canoe across the estuary or the lagoon. A wider track and rough means of crossing streams and other obstacles on foot or horse with pack or pack-saddle mark the course of pilgrimage or trade at a later period of development, and the force of the wind is enlisted by the bolder mariner going for his commerce further from the shore than he could in a boat propelled by oars. Gradually carts and wagons are introduced, and sailing ships become common, until with improved vehicles and more skilfully designed vessels the acme of rapid communication, so far as it was possible without mechanical assistance, was reached in the mail coach and the clipper of a hundred years ago. The former entailed a highly developed road system. Coaches and other land vehicles and sailing vessels ceased to be further improved and the road system to be more developed when on shore and sea steam-propelled transport became general, and on the land an iron tracery of rails was superimposed on the network of roads. It looked as if rail and tramways were going to carry practically the whole internal trade of both well developed and undeveloped countries, and that the road system was in the former case going to fall into comparative disrepair and in the latter to be left in a rudimentary stage. Then in the first decade of this century came the rapid development of motor transport, with the shifting to it in the older countries of some of the rail traffic and with the creation of new traffic in newer lands. A main road to-day means a motor road which will either feed or substitute railways according to whether the trade and traffic to be carried is heavy or light. It is the system of main roads in Queensland that is now to be explained by Mr. Kemp. There is certainly no higher authority on the subject in this country, and there are few subjects of greater importance to the country's material advancement. We can, therefore, promise Mr. Kemp the closest attention to what he is going to tell us and with this promise I now ask him to proceed with his lecture.]

It will perhaps be not out of place to first make some comments on how the existing network of tracks came into existence in this State.

The *Pioneer locator* of roads was the teamster, who followed in the wake of our early pioneer settlers or miners and who carried goods into the interior from the seaboard and later from railway towns.

* Abridgment of an Address to the Royal Geographical Society of Australasia, Queensland, 31st July, 1923.

Of primary importance to these men were routes which avoided swampy country or steep sidelong ground. They therefore often made long detours, and invariably when ascending a mountain or traversing broken country chose the flat tops of spurs by which to ascend to low gaps in the range, so as to minimise the risks of capsizing. Bullock teams were generally employed, and as grass was plentiful the provision of additional power required to negotiate steep grades was not nearly so expensive as at the present day.

Levelness of cross-section and straightness of the road were therefore of paramount importance to the teamster, but even before he could reach a spur to make an ascent his difficulties had commenced. He had to choose sound country where his vehicle would not bog and he had to cross small and large streams often swollen by flood at the most suitable points—that is, where the banks were not too steep and where the stream bed was sound and the stream shallow.

In the western country the proposition was quite different.

The first consideration was nearness to feed and water; hence the main track followed rivers. Drovers largely used these roads; hence, when afterwards surveyed, they were often made up to a mile in width.

In good seasons native grasses—Mitchell, Flinders, &c.—kept the stock and team in hard condition.

When a teamster left these main routes he generally traversed the shortest possible route between homesteads.

The rapid development of mining fields and extension of settlement in some areas brought heavy coaches upon the roads, and such firms as Cobb and Co. ran regular mail and passenger services, which demanded something better in the way of roads than the teamsters' tracks, which were undrained, unformed, and dodged in and out through the timber.

Hence, the construction of corduroy or pitched stone foundations covered with broken stone or gravel came into vogue along the important routes, such as Maryborough-Gympie, Brisbane-Warwick, Townsville-Georgetown, and Warwick-Stanthorpe.

Parliamentary records indicate that even in 1860 the question of road construction seriously exercised the minds of those in authority, and large sums of money were annually expended—£7,000 per mile.

As land was thrown open for selection in smaller areas the surveyor took his place in the highway scheme.

He generally adopted the old bullock tracks as a basis for his road system, and his reason was obvious.

Funds for road improvement were limited; hence it was useless for him to locate a road having a good alignment and grade if it involved heavy side cuttings, extensive culverts, and bridges.

Also he avoided much preliminary investigation and simply took the line of least resistance so far as he was concerned, but which has since proved a serious hinderance to the progress of many a settlement.

When the difficulties under which he laboured are recognised, we must not blame him too much if he did not always obtain the best results. Often he could only see a few yards ahead in the dense tropical scrub. Later on the surveyor was instructed by those in authority to take care that his grades did not exceed 1 in 14, unless considerable difficulties existed in the way of construction, and clauses were inserted in land leases providing for the resumption of any land necessary at any future date for road purposes.

Pioneer roads have been constructed by the Lands Department for many years when opening up new areas, but as the cost is loaded on to the land the works are cut down to the minimum sufficient to enable the settler to reach the railway or port.

Local authorities have been improving these primitive roads to the best of their ability, but generally without proper engineering advice, and as a consequence very little of a permanent nature has been achieved, considering the energy and money expended. Also their revenues and borrowing powers have been rather too limited for them to tackle road problems in a scientific and businesslike manner.

As railway construction advanced, especially on main lines stretching along the coast and far into the interior, many of the old roads fell into disrepair and disuse, and even such important roads as the Brisbane-Ipswich and Ipswich-Warwick roads come under this category.

Bridges tumbled down and were not replaced, and road foundation became broken up. But later, with the advent of motor traction, the absolute necessity of reconstructing some of these roads, especially those connecting large cities or areas of productivity, became apparent.

Unfortunately some of these routes ran through poor country, and the Local Authorities were reluctant to repair national highways carrying "through," or, as they termed it, "foreign" traffic.

Also the possibility of opening new land for dairying and agricultural purposes up to 40 miles away from railways by means of roads fit for motor traction became apparent.

Roads as feeders to the railways and for intercommunication purposes generally became more and more a necessity.

Much rich tableland and range country in Queensland, although long settled, was not giving the reward to the pioneer settlers and their descendants to which they were entitled, chiefly by reason of the lack of reasonable transport facilities.

Without enumerating all such cases, the following are cited:—Atherton Tableland, Maleny and Montville, Beechmont, Tambourine, and Springbrook.

In an attempt to remedy the very undesirable state of affairs existing in relation to road construction in Queensland, the Government in 1919 introduced the Main Roads Act, the Minister in charge of the Bill being the Hon. W. N. Gillies, a most enthusiastic supporter of a good-roads policy.

A Good Roads Association had been previously formed, and this body and the Royal Auto. Club lent their support.

The Act is very similar to the Victorian Country Roads Act, which in turn is modelled on similar Acts in U.S.A.

It provides that the Board shall investigate road problems and construct roads and bridges.

Local Authorities have powers of objection to the Board's proposals, and are required to repay one-half the cost of permanent works over a 30-year period, the State finding the other half of the funds.

The Board also maintains declared main roads, and Local Authorities may be charged up to one-half the cost, repayable the following year.

The pressing need for good roads suitable for all classes of traffic can be understood when it is stated that there were in 1920 51,600 wheel vehicles and 8,000 cars in Queensland. To-day the autos exceed 17,000, whilst I am sure that some of the lantern slides will bring home to the audience some of the difficulties of transport in the country.

The main points to be attended to in the construction of a road are drainage, location, and proper use of paving and surfacing material, but as enough could be said on these subjects to fill many books, I will not offer any further remarks on those subjects, the importance of which will to some extent be illustrated by the slides.

Soil and climatic conditions and the character of traffic require to be carefully studied before the type of road, class of materials to be used, and thickness of paving material is decided upon.

Thus it will be seen that roads have been brought into being in Queensland, as in the other States of the Commonwealth, by the peaceful penetration of the pioneer and not, as in European countries, by military necessity.

GEOGRAPHICAL DISCOVERY AS A BASIS OF TERRITORIAL RIGHT.*

By F. W. S. CUMBRAE-STEWART, D.C.L., Registrar, Queensland University.

[In introducing the Lecturer, His Excellency the President said—

The President of the Geographical Society presents to you the President of the Historical Society, the Chancellor of the University introduces the Registrar of the University, and the Chairman of the meeting will presently call on the lecturer. And, after all, this triple introduction is quite unnecessary, as you all know Dr. Cumbrae-Stewart, who has so often led you through the too-short columns of the newspaper or too-few minutes of the lecture along the pleasant paths of historical research. This evening his history, to meet the circumstances of the occasion, will be geographical. Just as individual life is affected by environment, so is the history of nations by the geographical surroundings in which it has taken place. In dealing with one aspect of this influence this evening Dr. Cumbrae-Stewart will, I know, not only temporarily interest but also permanently instruct us. Without further postponing the treat to which you have been looking forward, I ask him now to do these two things.]

When the veracious Captain Lemuel Gulliver returned from his last voyage in the South Sea, he offered a few observations on the then-existing methods of enlarging His Majesty's Dominions by discoveries. He says—

> "A crew of pirates are driven by a storm they know not whither; at length a boy discovers land from the topmast; they go on shore to rob and plunder; they see a harmless people; are entertained with kindness. They give the country a new name; they take formal possession of it for the King; they set up a rotten plank or a stone for a memorial; they murder two or three dozen of the natives, bring away a couple more by force for a sample, return home, and get their pardon. Here commenceth a new dominion acquired by divine right."

This may be excellent satire; it is not a true account of the effect of geographical discovery in any view of international law that has ever met with acceptance.

This Society is more concerned with the facts of geographical discovery than with the rights as between nations arising therefrom. No apology, however, is offered for entering upon a consideration of the question of the territorial rights to which

* Read at a meeting of the Royal Geographical Society of Australasia, Queensland, 28th September, 1923.

discovery gives rise in view of the rising importance of International Law and its dependence upon those facts which it is the duty of Geographical Societies to record.

It is unnecessary here to do more than refer to the recently established Permanent Court of International Justice, and the possibility of claims before it based upon rights arising from discovery and occupation. There is every reason to believe that the existence of the tribunal will encourage claims of that nature. It is well, therefore, that we should not be unprepared in case we are called upon to substantiate our claim to the territory which we occupy or any part thereof.

What is meant by geographical discovery, and what exactly is the right conferred on the first discoverer of land? The only geographical discovery which need be considered here is the discovery of the new world by the nations of western Christendom from the fifteenth century onward. The causes which led to the discoveries were twofold, but they arose out of the Mahometan conquest of the East. The effect of this was a serious interference with the trade routes from East to West. Spices no longer reached the Western nations, and a power hostile to Christendom had arisen and had overthrown and enslaved Christian peoples. The Crusaders failed to rescue the Holy Places or to free their fellow-Christians. Prince Henry the Navigator would succeed where Cœur-de-Lion was turned back. Though the Prince did not live to see it, those whom he had trained and inspired reached the Indies, sailing southward, seeking Christians and spices. Then Columbus, under the Spanish flag, also reached the Indies as he thought, sailing to the west. Prince Henry the Navigator's countrymen the Portuguese were alarmed for their trade, and took steps to protect it.

The State system of Western Europe in the fifteenth century differed considerably from what it became in the sixteenth and seventeenth. Christendom had a head, not always recognised, it is true, but always ready to act as a peacemaker and an arbitrator, and able to enforce his awards by spiritual sanctions. Thus, though—

> "The good old rule, the simple plan
> That those should take who have the power,
> And those should keep who can."

was in full force and effect, it was controlled in its exercise by the fear of excommunication.

It has been said by Sir Henry Maine that the Roman law regarding *occupatio* or the taking possession of anything which has no owner, and the rules into which the jurisconsults expanded it, is the source of all modern international law on the subject of the acquisition of sovereign right in newly-discovered countries. That is, I think, true when the discovery of the new world had been made and disputes had arisen; but it is not true that the early Portuguese and Spanish discoverers were consciously guided by any legal principles—unless we extend legal principles to include the right to take by force. They were, in their own opinion, engaged in a crusade against the Infidel, who had closed the Eastern trade routes. The new islands and mainlands which they discovered they took, if they wanted them; if not, they passed on to their goal, and when they reached India all they did at first was to establish trading stations.

As between the discoverers themselves and the Crown of Portugal, a Bull of Pope Sixtus IV. made over, in 1481, all discoveries south of Cape Bojador to the King. Spain was not inclined to interfere—possibly recognising Portugal's rights—until, in 1492, Columbus, sailing west, reached land which he thought was part of the East Indies. On his return he put into the Tagus, and his story alarmed King John of Portugal. If there was a short cut to the Indies across the western ocean, and Spain was established upon it, Portugal's labours were in vain. Representations were made to Spain and to the Pope, with the result that two Bulls were issued by Alexander VI. Of these the Bull "Inter Cætera" alone need be mentioned. This was promulgated on 4th May, 1493, and purported to assign to the Kings of Castile and Leon all the islands and mainlands discovered, or thereafter discovered, towards the west and south-west of a line from the North to the South Pole 100 leagues distant from the Azores or Cape Verde Islands, of which no other Christian King had actual possession. The Bull included a prohibition against any person whatsoever and of whatsoever dignity, even imperial or royal, state, degree, order, or condition, under pain of excommunication, from trafficking with or approaching these islands and mainlands. The line of demarcation was found to be unsatisfactory, and shortly afterwards, by the Treaty of Tordesillas, the line was fixed at 370 leagues instead of 100 leagues west, with the result that Brazil and much of the coast of North America went to Portugal, and that Portugal was protected in any place of which she had taken actual

possession, even within Spain's demarcation. But the most important matter dealt with by the Bull was the prohibition of trade. This was the real cause of all the subsequent disputes.

The two Bulls and the Treaty of Tordesdillas were binding upon Portugal and Spain, but however good a catholic Henry VII. of England might have been, he was precluded by English law from admitting the Pope's right to dispose of any portion of the world. Still he did recognise discovery as the basis of territorial rights, and he was induced to grant a patent to John Cabot, of Bristol, giving him any lands he might discover. But he was on friendly terms with the Court of Spain, and was contemplating the marriage of the Prince of Wales with Catherine of Aragon, and not wishing to offend he sent Cabot far to the north to discover, in 1497, part of the North American continent and take possession of it. There is little evidence relating to Cabot's voyage. If it could have been established that he reached terra firma in 1497, the American Continent was England's by right of prior discovery, for Columbus did not reach it till 1498. We have the evidence now, but it is too late to be of use. In 1501 Henry VII. issued letters patent to certain Bristol merchants empowering them to sail east, west, south, and north, to find, recover, discover, and investigate islands, countries, regions, and provinces, and to enter on and take possession thereof as King Henry's vassals, with permission to emigrate and make laws for good and quiet government. The lands discovered were to be held of the King by fealty only. As a matter of fact, however, the Spanish possessions were respected—not because the Papal Bulls conferred any title, but because English law and policy respected the title of anyone who in good faith had discovered and taken possession by entry of new lands.

The French not only ignored the Bull, but disputed the Spanish title to the New World, setting up an absolute claim based on an alleged prior discovery. This was wholly imaginary, but it was followed up by occupation, and French maps showed North America as "New France," and South America as "Antarctic France."

The basis of Spain's right was attacked in Spain itself, and forty years after the discovery of America there appeared the famous work of Francis de Victoria, a Professor of Law at Salamanca—"De Indis"—in which he asserted not only that the Pope

had no right to grant, but that the King of Spain had no right to take, the newly-discovered inhabited lands and to deprive their lawful owners, the Indians, of their country.

His arguments are unanswerable, but they were ignored. Aborigines had no rights. If they ever had, they had lost them by refusing to submit to the invaders of their country. All the countries of Western Europe were agreed upon that.

They were also agreed that certain formalities must accompany the taking of possession of newly-discovered countries. Columbus had raised the flag of Castile, and with his sword drawn, in the presence of as many as could be assembled, he had taken possession in the name of his master. This ceremony was everywhere repeated whenever authorised agents took possession for their sovereigns—the cheap pretence, as Rusden* calls it, recognised by Europeans as giving title to foreign lands.

But more vigorous opposition to the Spanish claim was found in England. In 1580 Drake returned from his voyage round the world, during which he had raided Spanish colonies and captured Spanish ships. The Spanish Ambassador insisted upon reparation. The nature of the English case in reply may be gathered from the draft of a despatch prepared by Walsingham and preserved by Camden.†

According to this document Spain was to be told that the English Courts were open to anyone asserting a claim against Drake, but in reality Spain had brought these evils on herself by excluding the English from the commerce of the West Indies contrary to the Law of Nations. England recognised no right on the part of the Pope to make a donation of the lands discovered in or beyond the ocean, and admitted no title of possession but actual occupation.

Here we have the earliest assertion of actual occupation as the only root of title, and the repudiation of claims resting merely on geographical discovery. But the quarrel between England and Spain could only be decided by the sword, and no formal reply was given. Within four years the Spanish Ambassador had been expelled, and war was inevitable.

This actual occupation, upon which it was asserted that territorial right was grounded, can be traced to the Roman law, by

* History of New Zealand, Vol. I., p. 65.

† Hill: History of European Diplomacy, Vol. II., p. 526.

which all property without an owner could be acquired by a finder taking physical possession with the intention of holding it against all comers.

"Discovery," says Heineccius, "is a kind of *occupatio*. *Occupatio* is the taking of something which belongs to no one, so there can be no such discovery of things lost by others so as to give us the right to them. Discovery is the taking of something which belongs to no one. It requires (1) an intention to take and (2) actual physical taking. Thus, one who first sees a thing does not make it his with his eyes. This can only be done by one who first 'occupies' or takes it."

The founders of International Law have applied these principles to geographical discovery, and thus it has come about that the Roman law regarding the finding of a jewel, the owner of which could not be found, has been applied to the finding of continents and the treatment of their inhabitants, not as the owners, but as slaves without any rights whatsoever.

The eighteenth century opinion on the subject is thus stated by Vattel:—

> "All men have an equal right to the things which have not yet fallen into the ownership of anyone, and these things belong to the first occupant. Therefore when a nation finds an inhabited country without an owner it may lawfully take it, and after the taker has sufficiently evidenced its intention to do so it cannot be dispossessed. Thus navigators on voyages of discovery under lawful commissions finding islands or other places have taken possession of them in the name of their nation, and ordinarily this title has been respected, provided that it had been followed closely by a real possession."*

"The present state of opinion on the subject," says Westlake, "may be summed up by quoting the declaration adopted by the Institute of International Law at Lausanne in 1888:—

> (1) The occupation of a territory so as to give sovereign rights over it cannot be recognised as effective unless the following conditions exist:—
>
> (*a*) The taking of possession of a territory within definite limits made in the name of a Government;
>
> (*b*) The official notification of the taking of possession.

* Vattel: Droit des Gens, Book I., Cap. XVIII., p. 207.

"Taking of possession involves the establishment of a local responsible authority provided with means sufficient to maintain order and assure the regular exercise of its authority within the territorial boundaries occupied. These means may be borrowed from existing institutions in the country occupied.

"Notification of the taking of possession is made either by publication in the form used in each State for notification of official acts or through diplomatic channels. Such notification must contain an approximate delimitation of the territory occupied."*

The most that can be said for prior discovery to-day is that if a navigator returns home and says that he has discovered an unknown island the other States are constrained by the comity of nations to wait for a reasonable time before sending out expeditions to annex it.

Let us now examine the title deeds of Australia in the light of the above principles.

Under the Bull, and probably by first discovery, Portugal had a title at one time, but no claim has ever been made by that power or by the other early discoverers, the Dutch. Great Britain's claim originally rested on the discovery of Captain Cook of the east coast, of which he took formal possession from the 38° of South latitude to Cape York at Possession Island, in 1770.

By the Orders in Council issued under an Imperial Act of 1786, the King in Council designated the east coast of New South Wales, or some or other of the adjacent islands, as a place to which offenders might be transported. This necessitated the fixing of a western limit, to the jurisdiction of the Governor.† Thus though the original settlement was confined to Port Jackson in Sir Thomas Brisbane's time, the territory under his jurisdiction extended west to the 135° parallel. Up to this time no claim had been made by any power to the western portion of the continent.‡

---

* Westlake: International Law, Part I., p. 112.

† For a discussion of the reasons which led to the fixing of the western boundary at the 135th meridian, *see* N. Lockyer, "The Progress of British Possession in Australia," "Victorian Historical Magazine," June 1915, pp. 162-172.

‡ See Hist. Rec. Aust. Ser., Vol. I., Note I.; Vol. X., p. 590; Vol. XI., Note 124; Vol. XII., Note 150.

North Australia.

The establishment of Singapore and the growth of British trade which immediately followed was countered by the Dutch, who adopted a policy of exclusion in respect of their East Indian possessions.

It was thought that a British settlement on the north coast of Australia would lead to a substantial trade with the Malays and break the Dutch monopoly, and at the same time would prevent the Dutch from founding settlements on the Australian Coast.

A letter written by Sir John Barrow of the Admiralty to Mr. Horton, Under Secretary for the Colonies, in 1824, shows that there was a real fear of Dutch occupation at the time. He wrote:—

> "It would be well to bear in mind that they (that is, the Dutch) would have a justifiable plea in planting an establishment on any part of the northern coast in our example of taking possession of the eastern coast and the island of Van Diemen, the original discovery of which by the Dutch is not to be disputed. Indeed I believe it is admitted, though not provided for (that I am aware of), by the Law of Nations that occupancy is a stronger title than priority of discovery, but be this as it may, in the present instance our own conduct might be quoted against us."*

It was determined to forestall Dutch attempts to obtain the north coast, and Captain Bremer—after whom the Bremer River is named—was instructed to proceed in H.M.S. "Tamar" to the north coast. His orders were to go to Apsley Strait, between Melville and Bathurst Island, and establish the first settlement. He was next to examine Port Essington and establish a settlement if the land in the neighbourhood should prove suitable. If these places were already occupied by Europeans he was to take possession of Liverpool River or, failing this, to form a settlement on the nearest convenient situation or situations to the north-west extreme of New Holland. He was told that it was highly important that formal possession should be taken of, and His Majesty's colours hoisted upon, Bathurst and Melville Islands and Coburg Peninsula.

In execution of these orders, on 20th September, 1824, Captain

* Hist. Rec. Aust., Ser. III., Vol. V., p. 752.

Bremer took possession of the north coast of New Holland between the meridians of 129° and 135° east of Greenwich and all the islands "laying off," as he described them.

He hoisted the flag at Port Essington on the 20th, and at Melville and Bathurst Islands four days later. There was no sign of any Dutch occupation.

The territory thus occupied was outside the western boundary of New South Wales. To bring it within the colony Sir Thomas Brisbane's successor, Governor Darling, received a commission extending his jurisdiction so as to include the coast of which possession had been taken by Captain Bremer. In other words Great Britain definitely claimed all Australia, except what is now Western Australia. The next step taken was to secure that territory.

Western Australia.

The right of discovery lay with the Dutch, but they had found nothing to justify the settlement of the country, nor did they make any close examination of the southern part of the coast. This was examined by various British and French navigators between 1791—when Captain Vancouver discovered King George's Sound—and 1803.

These discoveries were not followed up except by the establishment of sealing stations, and in 1826 all Australia to the west of the 129th meridian was unclaimed by any European nation. Under these circumstances written instructions were sent to Governor Darling, accompanied by secret instructions from Lord Bathurst.*

The secret instructions show that there was genuine fear that the French had designs on Western Australia, and a determination to resist any attempt to establish a foreign settlement on Australian soil.

The instructions were for the formation of a settlement at Western Port, evidently in mistake for King George's Sound. Western Port was already in New South Wales, but it was duly and formally occupied, and a fort built there. King George's Sound was occupied by Major Lockyer of the 57th, the discoverer of Lockyer Creek in 1825. The brig "Amity" carried him thither with orders to select a site for a settlement and take possession.

* Dated 1st March, 1826. Printed in Hist. Rec. Aust., Ser. I., Vol. XII., pp. 194-5.

Having landed at Port Royal Harbour and built a fort, on 20th January, 1827, he hoisted the British flag and fired a royal salute from the fort.

This was followed by the foundation of a settlement at the Swan River by Captain Fremantle, R.N., in H.M.S. "Challenger." His instructions were to proceed to the Swan River, on the western coast of New South Wales, and take formal possession of that part of the coast in the name of His Majesty, which possession was meant to be extended to the whole of the western coast.*

Thus the British rights to Australia, at first limited to the eastern portion, were extended to cover the whole island continent. Possession has been continuous ever since, and, although it may be said that very little settlement has been done in one hundred years, there is nothing in International Law as at present accepted which can invalidate the title gained by occupation and settlement. But it was a close thing. In October, 1826, the French discovery ship "Astrolabe" had come into King George's Sound before Major Lockyer got there. Luckily the French did not take possession, otherwise we might have inherited a dispute with a first-class naval power.

New Zealand.

New Zealand was first discovered by the Dutch in 1642, but there was no effective occupation until 1840, when the authority of the Governor of New South Wales was extended to any territory of which the sovereignty has been or may be acquired in New Zealand, and Captain Hobson, R.N., was appointed Lieutenant-Governor. By the Treaty of Waitangi the native chiefs ceded such right of sovereignty as they possessed to the Queen, and the Queen guaranteed their right as British subjects. Stewart Island was taken possession of by right of discovery, there being no natives when the officer sent to proclaim the sovereignty landed there. In the other two islands the treaty was taken to cede the sovereignty, which was formally proclaimed at various places along the coast.

But the French had designs on New Zealand, and a colonising expedition was on its way while Captain Hobson was proclaiming the Queen's sovereignty. When the French arrived at Akaroa, they found a British man of war in the bay and a court of petty sessions sitting on shore. The French settlement at Akaroa was

* Hist. Rec. Aust., 3rd Series, Vol. VI., p. 614.

never prosperous, and eventually broke up, leaving the British in undisputed possession of New Zealand, and before the end of 1840 it was formally separated from New South Wales.

New Guinea.

New Guinea was the latest acquired British possession in Australasia. By right of discovery it belonged to Portuguese, Spanish, Dutch, and English, but no possession was taken until 1828, when Captain Steenboom, of the Dutch ship "Triton," hoisted the Dutch flag at Port Dubus. His proclamation on the occasion was printed and appeared in the "Annual Register." The settlement was abandoned on account of the unhealthiness of the place. In 1883 the Queensland Government purported to annex so much of the island as was not Dutch territory. This act was of no validity, since no colonial government has power to act outside its jurisdiction.

On 6th November, 1884, a British protectorate was proclaimed over the southern coasts of New Guinea from the 141° meridian of east longitude eastwards by Captain Erskine, R.N. The boundaries of the Protectorate were laid down with much exactness. The following month the Germans hoisted the German flag on the north coast, and took possession of the part not claimed by the British or Dutch.

On 6th April, 1886, the boundaries between the British and German spheres were settled, and in 1888 letters patent were issued erecting the Protectorate into a British possession. In 1914 British forces captured the German possessions, but under the Treaty of Versailles, instead of continuing a British possession they became mandated territory, for the control of which Australia is responsible.

In the territory of New Guinea once occupied by Germany and now held under mandate from the League of Nations by Australia, are New Britain and New Ireland.

These groups of islands were discovered by Dampier, an Englishman. Possession was taken of them in 1767 by Captain Carteret, R.N., but his action was not ratified, and therefore was of no effect, although he held the King's commission.

This affords a good illustration of the principle that for the acquisition of territorial rights an act of State is necessary, either

direct by previous instruction or adopted by ratification of an agent's acts. Thus the act of a private individual, not being an act of State, cannot even make a beginning of annexation, and is incapable of ratification. Dean Swift's pirates could not by any known principle of international law have acquired any right for their nation.

The Nootka Sound Case.

There have been several international disputes in which questions of discovery and occupation were involved. The most important of these was the Nootka Sound dispute. In the year 1778 Captain Cook was on the west coast of North America, and entered a fine natural harbour on the western coast of what we now call Vancouver Island. This harbour was inhabited by natives, with whom Captain Cook established friendly relations. Captain Cook called the place King George's Sound, and also gave it its native name, Nootka Sound, and brought away from it valuable furs.

The rebellion of the American colonists interfered with the development of trade and settlement, but after the peace in 1783 an attempt was made by the East India Company to open up trade between China and Nootka Sound. In 1788 there were several ships engaged in the trade, and the senior captain, John Meares, a retired lieutenant of the Royal Navy, bought land from the Indians, formed a settlement, and hoisted the British flag. Following on this an associated company was formed, more rights acquired from the natives, and Chinamen induced to settle under British protection.

Spain now appeared and set up an adverse claim. Under the Bull and the Treaty of Tordesillas she claimed exclusive right over the Pacific Ocean and all the western coast of America as far north as 60 degrees. In addition it was alleged that four years before Captain Cook a Spaniard named Peres had discovered Nootka Sound. Captain Cook expressly repudiated this, and nothing had been made public concerning Peres' operations. No attempt to form a settlement or to trade had been made by Spain until she heard of English and Russian attempts to develop the fur trade. Then the Viceroy of Mexico sent an armed force with orders to warn off intruders, and in case of armed resistance to use force to vindicate Spanish claims. Apparently little was known of what

was going on, and the Spaniards expected to find a few Russian fur traders. Instead of this, before very long the Spanish squadron had seized not only four British ships, but also the settlement at Nootka. The Spaniards treated the British as little better than rogues and vagabonds. It was some time before the news reached England in January, 1790. This was followed by a demand from the Spanish Ambassador a month later for punishment of the alleged interlopers. In March, 1790, Meares sent a memorial to the British Government, setting out the cruelty practised on him and his fellow-subjects. He estimated the damages for the loss of the trade at Nootka as half a million dollars. The British Government was thus involved in a pretty quarrel. To admit the justice of the Spanish claims would have at least closed the north-west coast of America to all but Spanish ships, and the demand for the punishment of British subjects was not likely to be granted. The reply of the British Government was a denial of the Spanish claim and an assertion of the determination to protect its subjects trading in the Pacific Ocean, followed up by what is known as the Spanish Armament. The British fleet was made ready, and no fewer than ninety-three sail of the line were fit for active service. To this display of force Spain had no answer unless she could find an ally ready to espouse her quarrel. France was in the throes of revolution, and might do anything according as the gusts of popular passion blew. Europe generally was disturbed, but no help came for Spain, and on 28th October, 1790, the Nootka Sound Convention was signed. By it Spain agreed to restore the buildings and land at Nootka and pay damages, and to abandon her exclusive claims to the Pacific and South Seas, though British ships were still prohibited from approaching within ten maritime leagues of any Spanish colony.

Pitt's triumph was complete when the House of Commons passed a resolution thanking His Majesty for the Convention. Alderman Curtis (great-grandfather of our Captain Curtis) spoke on this motion. The importance of the Convention can hardly be overestimated. Firstly, it ended Spanish claims to the Empire of the Pacific. Secondly, it secured the access of Canada to the west coast. We know now that Spain and Russia were then contemplating the appropriation of the whole west coast line. Thirdly, it completed the all-red route round the world, for British Columbia holds a strategic position in the west similar to that of Egypt in the east. If Spain had been able to enforce her claim there would have been no British Empire.

The Louisiana Boundary.

The Louisiana Boundary question arose between the United States and Spain after the cession of Louisiana to the United States of America in 1803. The facts were as follow:—

The northern coasts of the Gulf of Mexico were explored by the Spaniards between 1518 and 1561, but they were imperfectly known, and no settlement was made. In 1681-2 the French came down the Mississippi and took formal possession of the country at its mouth. Four years later they erected a fort on the coast, and held it till 1689, when it was abandoned. In 1690 the Spaniards founded a settlement, and from it other settlements were formed on the coast and inland in what is now Texas. In 1712 the French, relying on the acts of appropriation and settlement between 1681 and 1689, laid claim to the whole coast and founded a settlement near the site of New Orleans, with subsidiary stations on the coast. Spain placed a fort to watch one of these stations in 1714, and kept it till 1760, when France ceded Louisiana to Spain. Spain gave it back in 1800; and France ceded it to the United States of America three years later, and the United States of America, as assignees of the French, claimed the basin of the Mississippi by right of discovery and of settlement, and the province of Texas by virtue of their occupation of the coast.

The French claim to the basin of the Mississippi was not seriously contested, but with respect to Texas it was contended that the Spanish discoverers had given Spain possession before the French landed there, that the French lodgment there was merely temporary, and that the long-continued and uninterrupted subsequent possession of the whole country by Spain was a better root of title than a prior unsuccessful attempt by the French. Ultimately the boundary was settled along a line suggested by Spain as part of a general scheme of boundary settlement. In this case it was not disputed that the Spanish were the first discoverers, but Spain did not contest the French rights gained by occupation and settlement.

The Oregon Claims.

The north-west coast of America again became the scene of a dispute in the middle of the last century. This time the claimant was the United States, and the claim extended to the district drained by the Columbia River and the whole territory west of the Rocky Mountains as far as parallel 54 degrees 40 minutes North.

The grounds of this claim were stated to be discovery, exploration, and settlement, and the United States relied upon alleged rights derived from France and Spain as well as on her own proper rights. As to the discovery the claimant relied upon prior discovery by Spain in 1775, and further claimed that by the discovery Spain was entitled to the whole area drained by the river, and they claimed that all Spanish rights were transferred to the United States by the Treaty of Florida in 1819.

The French claim—or pretended claim—was that under the Treaty of Paris between Great Britain and France, in 1763, Great Britain had ceded to France all her claims to the region west of the Mississippi, and that France had transferred her rights in 1803 to the United States of America.

The United States also made claim arising out of the alleged discovery by an American named Gray, who sailed up the Columbia River on 11th May, 1792, and, further, they alleged that Americans had settled on the river in 1809. The answer to this was as regards the claim through France that France never had any rights to cede to the United States. As regards Spain, that whatever rights she may or may not have had, the Nootka Sound Convention disposed of her claim entirely.

The American claim by discovery amounted to nothing, and was later than the discoveries of Meares and Vancouver, while as to the American settlement they had been conquered in the war of 1812, and only restored under an agreement. Captain Vancouver sailing under a Royal Commission had taken possession in 1792. Gray was a mere private individual, and his voyage was only known through Vancouver's account of him, and on the part of Great Britain it was urged that Captain Cook, in 1778, and Sir Francis Drake, in 1579, were the true first discoverers.

The matter was settled by a treaty in 1846, which defined the boundary between British and United States territory. The interpretation of this treaty caused much trouble, and the question was not finally settled until 1871 by three experts appointed by the Emperor of Germany, to whom the matter had been referred for arbitration.

The Venezuela Dispute.

One of the latest occasions on which the old idea that geographical discovery could be the basis of territorial claims was the dispute between Great Britain and Venezuela over the boundary

between British Guiana, which went on during the last half of the nineteenth century. The rights of Great Britain were derived from the Dutch, by whom Demerara, Essequibo, and Berbice had been ceded by treaty in 1814. Venezuela's claims were derived from the Spaniards, and rested on the old Spanish claims based on discovery, exploration, and Royal grants, and ultimately, of course, on the Bulls of Alexander VI. If this claim was good, then the whole of the United States belonged to Spain, for it fell within the portion allotted to Spain by the Bull. From where Cabot's voyage ended the whole coast of the Atlantic was first discovered and formally occupied by Spain.

The British claims rested upon actual settlement. In 1822 the first claim was made that British colonists were settling on the banks of the Essequibo which was claimed by Venezuela. In 1841 R. H. Schomburgk surveyed what became known as the Schomburgk line, fixing the boundary. This was not accepted by Venezuela, and, after much diplomatic correspondence, in 1884 Venezuela approached the United States with the suggestion that the British were attempting to extend their dominion on the free and sacred soil of America. This specious and dishonest plea was worked for all it was worth. The Press fanned the flame, and there was an outburst of what the Americans call spreadeagleism and denunciation of the wicked power which was forcibly depriving an American State of the right and power of self-government and of shaping for itself its own political fortunes and destinies. Lord Salisbury's reply was that Great Britain was not in the least concerning herself with how the Venezuelans cared to live, and that it was a mere boundary dispute. Selecting a time when Great Britain was embarrassed in South Africa, the American President sent a message to Congress on 17th December, 1895, which was practically a declaration of war, and Congress appointed a commission* to investigate and report upon the true divisional line between the Republic of Venezuela and British Guiana. This commission set to work† on the records of Spain and Holland. They did a vast amount of historical research, and found nothing. The British claims, resting on fact of occupation, could not be overthrown, and in November, 1896, Great Britain was content to let the case go to arbitration and pocket the insult

* For Review of the Report of the American Commission, *see* Amer. His. Review, Vol. III., p. 580.

† For an account of the work of the American Commission, *see* same Vol. IV., p. 470.

by America. The arbitrators sat in Paris in 1899, and, as arbitrators usually do, compromised the matter, but, on the whole, it was in Great Britain's favour.

It is interesting to note the terms upon which the dispute went to arbitration as set out in clause 2 of the Treaty—

(*a*) Adverse holding or prescription for fifty years shall make a good title. The arbitrators may deem exclusive political control of a district, as well as actual settlement thereof, sufficient to constitute adverse holding or to make a title by prescription.

(*b*) The arbitrators may recognise and give effect to rights and claims resting on any other ground whatever valid according to International Law, and on any principles of International Law which the arbitrators may deem to be applicable to the case and which are not in contravention of the foregoing rule.

(*c*) In determining the boundary line, if territory of one of the parties be found by the tribunal to have been at the date of this Treaty* in the occupation of the subjects or citizens of the other party, effect shall be given to such occupation as reason, justice, the principles of International Law, and the equity of the case shall in the opinion of the tribunal require.

In the Venezuelan case political recklessness nearly brought about a war between Great Britain and the United States, not because of anything in dispute between them, but on account of a petty territory claimed by a third Government, and an assertion of a speculative proposition in International Law of recent invention and doubtful authorship.†

The Carolines.

In 1875 the dispute between Spain and Germany for the Carolines was referred to Pope Leo XIII., and he decided for Spain, but he did not go upon the title by discovery, nor did he even allude to the Bull of his predecessor. He based his award upon repeated acts of occupation by Spain down to the very moment the dispute arose.‡

---

* Hertslett: "Commercial Treaties," Vol. XX., pp. 943 and 946.

† Dawson: "The Line of Demarcation of Pope Alexander VI." Proceedings and Transactions of the Royal Society of Canada, 2nd Series, Vol. V., pp. 468-9.

‡ *Ib.* p. 481.

It would seem therefore that effective occupation is the only basis of territorial right likely to be recognised by the law of nations. That is, of course, a question of fact. There can be little doubt that, given time to prepare our case and a fair tribunal, we could make good our claim to all the British possessions in the Pacific. There is no danger from the tribunal. The danger lies in the prevailing ignorance of the facts of Australian history and indifference regarding International Law.

THE THEORY OF GRAVITATION.*

By H. J. PRIESTLY, M.A., Professor of Mathematics, Queensland University.

[In introducing the lecturer, the PRESIDENT said—

However much the public at large may appreciate the practical results of scientific discovery, they do not, as a rule, become enthusiastic over new scientific theories, especially if they do not affect human life. A notable exception to this has been Einstein's theories in their relation to the axioms of geometry and to the laws of gravity. The most common view of the effect of these theories, at any rate on their first announcement, was that Euclid and Newton were all wrong. This was hailed with delight by the schoolboy and by the vast majority of adults represented by the non-scientist. "Splendid," said the schoolboy, "I knew that it was no good learning that the angles at the base of an isosceles triangle were equal, and all that sort of rot." "Splendid," said the non-scientist, "all those stuck-up scientists only knew wrong what we were sensible enough not to know at all." Fortunately members of the Royal Geographical Society of Australasia, Queensland, are all scientists, and they are not disposed lightly to deal with so grave a subject as gravity. They recognise the geographical bearing of its laws in making the earth move as it does, and, in fact, in making the earth and all that is on it as it is. We shall listen with the greatest interest to what Professor Priestly will tell us about the history of gravitation. He has been too long in Brisbane and Professor there of the purest of the sciences to need introduction from me. I ask him now to deliver his lecture.]

In 1560 Tycho Brahe, a fourteen-year-old undergraduate of the University of Copenhagen, witnessed a partial eclipse of the sun. This experience turned his attention from Rhetoric and Philosophy, which he was studying with a view to a political career, to Astronomy and Mathematics. He devoted his considerable private means to the establishment and maintenance of an observatory, in which he carried out a series of observations on the motion of the planets.

To his chief assistant, Kepler, Brahe deputed the task of correlating and summarising the results of these observations, and in 1609 Kepler published his first two laws of planetary motion:—

I. The path of each planet relatively to the sun is an ellipse with the sun in one focus.

II. The radius vector from the sun to the planet sweeps out areas at a uniform rate.

---

* Abstract of an Address to the Royal Geographical Society of Australasia, Queensland, 26th October, 1923.

Ten years later the third law appeared—

III. The square of the period of revolution of each planet is proportional to the cube of its mean distance from the sun.

Meanwhile, in Italy Galileo was carrying on his theoretical researches on uniform and uniformly accelerated motion and his experimental investigation of the motion of falling bodies. He published his results in 1638 in the "Dialogues on Two New Sciences." This work must ever rank as one of the greatest scientific treatises. The value of the results achieved and the clearness of the exposition have rarely been surpassed; moreover, the concise incidental explanations of scientific method are invaluable and should be studied carefully by all interested in the foundations of modern science. Its important contributions to the development of the theory of gravitation are found in—

(1.) The statement of the Principle of Inertia, which was afterwards restated in the Principia and appears in our modern text-books on Dynamics as Newton's First Law of Motion;

(2.) The conclusion that freely falling bodies are uniformly accelerated.

The publication within the lifetime of one generation of Kepler's laws and Galileo's work on falling bodies turned the attention of the British scientific world to the problem of gravitation. Three famous Fellows of the Royal Society of London—Wren (the architect of St. Paul's), Hooke (the founder of the theory of elasticity), and Halley (of comet fame)—attacked a simplified problem. Treating the planets as points moving in circles, and the sun as an attracting point at the centre of the circles, they deduced from Kepler's Third Law that the attraction on any planet must vary inversely as the square of the distance. They then took the inverse square law thus suggested by the simplified problem and attempted to prove that a system of planets subject to such a law would move in the manner described by Kepler.

In this attempt they evidently failed, for in August, 1684, Halley visited Cambridge to consult Newton as to the path of a planet moving under the inverse square law of attraction. Newton had already investigated the question and promised Halley a proof of the fact, discovered in 1679, that the path is an ellipse. On receiving the document in November, Halley was so impressed with

its importance that he made a special journey to Cambridge to persuade Newton to attack the whole problem of gravitation and to publish his results. The outcome was the Principia, which appeared in 1687.

This work is cast in the geometrical form which, before the development of Mathematical Analysis, was looked upon as the ideal of clear and accurate mathematical exposition, and of which Euclid's Elements was the supreme example. It abounds in scholia or notes, which derive great interest and importance both from the light they throw on the development of Newton's ideas and also from their references to many of his famous contemporaries.

The lengthy note to Definition V. (centripetal force is that by which a body is drawn or driven or in any way tends towards any point as to a centre) shows so clearly the train of thought which led to the whole work that I propose to translate all of it—

"Of this kind is weight, by which bodies tend to the centre of the earth; magnetic force, by which iron seeks a magnet; and that force, whatever it may be, by which the planets are continually drawn from rectilinear motion and compelled to move in curves. A stone, swung round on the end of a rope, tries to move away from the controlling hand; and by its attempt extends the rope—the more strongly the faster it revolves—and directly it is released it flies off. The force opposing this attempt, by which the rope continually draws the stone towards the hand and keeps it in its orbit, since it is directed towards the hand, or centre of the orbit, I call a 'centripetal force.' The case of all bodies which move in closed paths is similar. They all attempt to recede from the centre of the orbit, and unless some force opposing that attempt is present to keep them in their orbits (and which I accordingly call 'centripetal') they will move away with uniform motions in straight lines. A projectile in the absence of weight would not be deflected towards the earth, but would move away in a straight line into the heavens; and that with uniform speed if only the air resistance were removed. By its own weight it is dragged out of its rectilinear path and continually deflected towards the earth, more or less according to its weight and its velocity. The less its weight or the greater its initial velocity, the less will it swerve from its straight path and the further will it go.

"If a leaden ball, fired in a horizontal direction with a given velocity from a mountain top, would travel in a curved line a distance of two miles before it fell to the earth, with twice the velocity it would travel about twice as far, and with ten times the velocity about ten times as far, if only the resistance of the air were removed. And by increasing the velocity it would be possible to increase at pleasure the distance travelled and to diminish the curvature of the path until the ball would travel to a distance of ten, thirty, or ninety degrees, or even until it would complete the circuit of the earth before falling; or, finally, so that it would never fall, but would travel through the heavens into infinite space in virtue of its initial velocity. And in the same way as a projectile can, by its weight, be deflected in its orbit and made to move round the whole earth, so can the moon, either by its weight, if it be heavy, or by some other force towards the earth, be pulled out of its rectilinear path; and without some such force the moon cannot be kept in its orbit. This force, if it were too small, would not deflect the moon from its straight path to a sufficient extent: if too great, it would deflect it too much and drag it from its orbit towards the earth. It is necessary to know what is the right magnitude; and it is a task for the mathematicians to find the force by which a body moving in any given orbit with any given velocity can be kept in its path, and, conversely, to find the path of a body which is projected from a given point with a given velocity and acted on by a given force."

In this scholium Newton shows us the development of his ideas. The well-known phenomenon of the pull of a weight swung round in a circle suggests a connection between motion in an orbit and a force towards a centre. The fact that an increase of initial velocity increases the range of a projecteile suggests that a sufficient initial velocity would lead to an orbital motion about the earth, gravity providing the centripetal force. Finally, the motion of the moon may be of this type.

This idea was tested by a rough calculation. The value of the earth's gravitational attraction on the moon was calculated from the known value at the earth's surface by means of the inverse square law, and compared with the force required to keep the moon in its observed orbit. The agreement was not entirely satisfactory, and de Morgan states that the discrepancy was so great that Newton dropped the work in disgust. It is now believed that he was fairly well satisfied, and that the delay in the further development of his ideas was due to difficulties in working them out.

The work up to this stage was done in 1666 at Woolsthorpe, his birthplace, near Grantham, whither he had been driven by an outbreak of plague in Cambridge. He was then in his twenty-fourth year, and was a Bachelor of Arts of one year's standing.

It will be of interest to a Geographical Society to notice the influence of Geodesy on general gravitation theory.

The discrepancy in Newton's calculation of 1666 was subsequently found to be due to an error in the measurement of the earth. In 1679 he repeated his calculations, using Picard's improved value of the earth's radius, and found a close agreement between his two results.

The scholium quoted above concludes by setting a task for the mathematicians. I propose to outline briefly the way in which Newton himself undertook the task.

The points most important for their direct bearing on the theory of gravitation are contained in the first book of the Principia, which is entitled "The First Book on the Motion of Bodies," and is divided into fourteen sections.

The first of these sections merely develops a mathematical method for subsequent use, but the second opens with three propositions of great importance—

I. If a body moves under a force to a fixed centre its path will be a plane curve and the radius vector will sweep out areas at a uniform rate.

Corollary.—The theorem is still true if the centre is moving uniformly.

II. If a body moves in a plane curve so that the radius vector from a centre to the body sweeps out areas uniformly, then the body is acted on by a force towards that centre.

III. If a body moves so that the radius vector from a centre, moving in any way whatever, sweeps out areas uniformly, it is acted on by a force compounded of a force towards the centre and the force by which the centre is moved.

The significance of these three propositions is emphasised in the following scholium:—

"Since equal description of areas indicates the centre towards which acts the force by which the body is drawn from a

rectilinear path and retained in its orbital motion, why should we not assume in our subsequent work that equal description of area about a point always indicates orbital motion under a force towards that point?"

In the light of Kepler's Second Law—it is clear that Newton has in his mind the question—"Do not the planets move under a force towards the sun?"

It is well to emphasise that Newton expressly states that he attaches no physical meaning to the word "force." It merely denotes a mathematical concept introduced for purposes of description. Furthermore, as used here, it corresponds to what nowadays we call acceleration.

The fourth proposition deals with circular motion, and the sixth corollary to it shows that if the squares of the periodic times are proportional to the cubes of the radii of the orbits, the force obeys the inverse square law.

As we have already seen, this was proved by the London mathematicians, and Newton refers to the fact in a scholium of some historic interest—

> "The case of Corollary VI. applies to the celestial bodies (as Wren, Hooke, and Halley calculated independently), and I have planned to show more rigorously in the sequel how they indicate a force decreasing with distance according to the inverse square law."

The remaining six propositions of the second section deal with certain special problems in orbital motion.

The third section contains two fundamental propositions, namely—

> XI. If the orbit is an ellipse, the force is subject to the inverse square law.
>
> XV. If several bodies move in elliptic orbits with a common focus, the squares of the periodic times are proportional to the cubes of the major axes.

The remaining propositions up to 56 at the end of section X. deal with various special problems which have no direct bearing on our present subject.

Newton has now constructed a mathematical scheme of moving bodies, corresponding in many respects to the observed motion of the planets.

The first three propositions give Kepler's Second Law, the

eleventh deduces a law of force consistent with Kepler's First Law, and the fifteenth shows that Kepler's Third Law is consistent with this law of force.

The scheme is still incomplete, and Newton himself gives excellent summaries of its various limitations.

He opens section XI. with these words—

> "So far I have explained the motion of bodies attracted to a fixed centre such as can hardly exist in the nature of things. For attractions are between bodies, and by the third law of motion the actions between attracting and attracted bodies are always equal and opposite, so that if there are two bodies neither the attracting nor the attracted one can be at rest, but both, as if drawn by a mutual attraction, revolve about the common centre of gravity; and if there are many bodies (whether they are attracted by one or mutually attract each other) they must move so that their common centre of gravity is at rest or in uniform motion. Hence I now proceed to discuss the motion of mutually attracting bodies by considering the centripetal forces as if they were attractions, although perhaps, speaking physically, they should rather be called impulses. For we are now dealing with Mathematics, and to avoid physical discussions we use terms which are most easily understood by mathematical readers."

The last few sentences are important for the light they throw on Newton's method. Earlier in the Principia he has stated that no physical significance is to be attached to the term "attraction." It merely embodies a mathematical conception descriptive of a body's tendency to move towards a centre. Here he states that he still uses the term in the same sense when he is discussing the tendency of mutually attracting bodies towards their common centre of gravity, and that he is leaving on one side all reference to physical causes.

The early propositions of section XI. show that each of two mutually attracting bodies moves about the common centre of gravity in accordance with Kepler's Laws. The later ones discuss the motion of several mutually attracting bodies. They prove that, when the mass of one body is large compared with the masses of the remainder, the parts about the common centre of gravity are approximately in accordance with those laws. In discussing this question, Newton obviously is thinking of the sun and planets.

A proposition on three bodies contains the germ of lunar theory.

The section concludes with another scholium of great importance for the student of scientific method—

> "By these propositions we are led to consider the relation between central forces and those material centres to which the forces are directed. For it is reasonable to suppose that the forces which are directed towards a body depend on its nature and size, as in the case of magnets. And insofar as they arise from causes of this kind, attractions of bodies are to be estimated by attributing to each of their particles suitable forces and summing the result. Here I use 'attraction' in its general sense for any tendency of bodies to approach each other; whether that tendency arises from the action of the bodies, either seeking each other or agitating each other by some emitted influence, or from the action of the æther or the air or any medium whatever, material or immaterial, in impelling the contained bodies towards each other. In the same sense I use 'impulse,' as I am not dealing in this work with kinds of forces and physical qualities but with mathematical magnitudes and relationships, as I have explained in the definitions. In mathematical investigations we have to consider those magnitudes and relations of forces which are deduced from arbitrarily chosen postulates; then, when we apply our results to Physics, these relations are to be compared with phenomena to see what assumptions are suitable to explain the characteristic properties of attracting bodies. Only after we have done this can we profitably discuss the nature and causes of forces and their physical significance. Let us see, therefore, with what forces spherical bodies, built up of particles attracting in the way already explained, should act upon each other and what kind of motion should follow from such action."

This investigation is pursued in section XII., and this important result is obtained—

> "A spherical body attracts as if its whole mass were concentrated at the centre."

We can now summarise the foregoing work and trace the development of Newton's ideas—

(1.) The whirling of a weight at the end of a rope suggests that the motion of the heavenly bodies is dominated by a force to a centre; and Newton sets himself the task of formulating a mathematical scheme of motion that will agree with observed planetary motion.

(2.) An application of Kepler's Third Law to motion in a circular orbit suggests the inverse square law as the law of force.

(3.) Using this law, Newton shows successively that—

(*a*) A moving particle attracted to a centre but having no reciprocal influence on that centre moves in the way described by Kepler's Laws;

(*b*) Two mutually attracting particles move about their common centre of gravity in accordance with Kepler's Laws;

(*c*) The motion of a system of mutually attracting particles, of which one is large compared with the the others, is approximately in accordance with Kepler's Laws;

(*d*) If every particle of a spherical body attracts according to the inverse square law, the whole body attracts as if it were concentrated at its centre; and, consequently, in the preceding results the particles can be replaced by spheres.

It follows, then, that a system of spheres arranged as the sun and planets and moving under the inverse square law would move as our planetary system moves; or, in other words, the planetary system moves *as if* every particle of matter attracts according to the inverse square law.

The study of the planets has led to the formulation of a law of gravitation. The remainder of the first two books of the Principia is devoted to the deduction of further theoretical consequences of the law, and in the third book Newton compares his theoretical results with observed phenomena. He finds the theory adequate to explain—

(1.) The motions of the planets and their satellites;

(2.) The variation of gravity over the surface of the earth;

(3.) The motion of the moon;

(4.) The tides;

(5.) The precession of the equinoxes.

He also develops a method of determining the orbit of a comet from three observations of its position.

The substance of the Principia is due to the genius of Newton; but he himself said that if he had seen further than others it was

because he had stood on the shoulders of giants. Two of these were Kepler and Galileo. The actual publication was due to Halley. In the preface Newton himself says—

> "Edmund Halley, a man of great intellect and learning, laboured most earnestly for the production of this work.
>
> "Not only did he correct the proofs and get the type engraved, but he was the originator of the whole enterprise. For when I had shown him that I had discovered the nature of the motion of the celestial bodies he never ceased to ask me to communicate it to the Royal Society; till at last he succeeded, by his importunity and kindly encouragement, in making me think of publication."

It is fitting that Halley should have been the first to apply the new theory to the prediction of future events. His best-known achievement is the prediction of the comet that bears his name; he also calculated the region of totality and the time of occurrence of the total eclipse of 1715; and he predicted that transit of Venus that brought Captain Cook to the South Seas.

PRESIDENTIAL ADDRESS.*

By His Excellency the Rt. Hon. Sir Matthew Nathan, G.C.M.G., F.R.G.S., Governor of Queensland.

It is usual on the occasion of the Annual Meeting for the President of this Branch of the Royal Geographical Society of Australasia either to give an address on some specific and important geographical subject or to trace the recent progress made in geographical science throughout the world. I regret that I am not in a position this evening to do either of these things, not having had time available for the close research required in the one case or for the wide review necessary in the other. Nor do I propose to follow the example of some of my predecessors in substituting for these things an account of the past activities of the Society. I shall doubtless refer to past activities, but my remarks will be directed in the main to what we are doing at the present time and to the extent to which we are or are not accomplishing the objects of the Society as set forth in the revised constitution of 1900.

The first of these objects is scientific—the advancement of the study of physical geography and the exploration of Australia, with the islands and seas adjacent thereto, their physical features, geological formation, fauna and flora. The question whether we are properly carrying out this object at the present time can, I think, be answered in the affirmative, for a Committee has set about the investigation of these very matters on the Great Barrier Reef, and it was on the initiation of our Society that that Committee has been constituted of representatives of the various scientific institutions throughout Australia and New Zealand. Most of you now present heard the lecture given by Professor Richards at the meeting of this Society held on the 21st April, 1922, which, with a letter of the 14th June, 1922, inviting the appointment of representatives to the Committee, have since been published in the last issue of the "Queensland Geographical Journal." Subsequent action in the matter is set forth in the Society's Proceedings that will appear in the issue of the Journal about to be published, and especially in the report submitted by Professor H. C. Richards and Mr.

* Delivered at the Annual General Meeting of the Royal Geographical Society of Australasia, Queensland, 30th November, 1923.

Charles Hedley on their five weeks' exploration of a part of the Barrier in June of this year. The subsequent ten days' visit of a number of members of the Committee, accompanied by several scientists from overseas, in Australia for the Pan-Pacific Science Congress was a more hurried reconnaissance of a different section. The main effect of the work of both parties has been to stimulate interest in the proposed investigation and to show that if it is to have a full scientific and economic effect it must be long, continuous, and systematic. To the stimulation of interest in the subject resulting from the creation of the Barrier Reef Committee can, we hope and believe, be traced the decision of the Commonwealth Government to undertake, through the Royal Australian Navy with co-operation from the Royal Navy surveying ship on the station, the hydrographic survey of the reef. There is no doubt that this survey is really due. While the inner route for ships up the coast of Queensland and the coast line as shown on the Admiralty charts are compiled principally from surveys carried out in the last thirty-five years, the surveys of the Barrier Reef shown on these charts were those of Captain F. P. Blackwood and the officers of H.M. survey ship "Fly" in 1843-5. The operations of the "Fly" constituted a very fine piece of work, but they have left many records on the chart which show it to have been incomplete—such as "numerous small patches nearly awash"; "numerous detached reefs in this space"; "extensive line of breakers"; "not surveyed, reported to be full of coral reefs"—while most notably there are many hundreds of square miles covered by the note "not examined, but considered dangerous navigation." Captain Blackwood evidently did not consider his work finished and would have been shocked and surprised if he had known that its completion would have to wait another eighty years—a rather longer interval than that which separated his survey from Captain Cook's reconnaissance and nearly disastrous experience of the reef in 1770. I have on another occasion referred to the area between the inner and outer edges of the Great Barrier Reef, of not much less than 10,000 square miles, that has remained unsurveyed, to there being no surveyed outlet for 180 miles from the north end of the reef nor for 400 miles from the south end, and to the seven known passages in the remaining 550 miles being probably only a proportion of those that may become available as a result of the survey now to be undertaken.

But the survey of the reef is only one direction in which the

work initiated by the "Fly" is, we hope, presently to be continued. Just as the "Endeavour" carried not only Captain Cook but also Joseph Banks and Daniel Carl Solander, so the "Fly" carried not only Captain Blackwood but also J. Beete Jukes, who, as Professor Richards reminded us, was the first, eighty years ago, to give consideration to the problems of the Great Barrier Reef. The discussion of these problems has not marked time like the survey to which I have referred. It has gone forward like an infantry attack, in a succession of rushes, frequently held up by the inherent difficulties of the problem. I am convinced, possibly with a bias towards the methods of the military engineer, that the time has now come steadily to sap up to the various strong points of the position, and by continuous study to conquer its difficulties. To continue my ancient military metaphor, I do not think that it is possible to attack at once the whole front of the problem and, so to speak, throw up a first parallel along the entire position. In the first instance we shall have to go gradually, regulating the vigour of our attack by the supply of munitions made available for our operations. As we gradually show definite gains and thus entrench ourselves securely in the public confidence and esteem, this supply will grow and we will widen our efforts until they can be compared to the big schemes by which marine biological stations in different parts of the world have added to the world's knowledge of oceanography, have solved many practical problems, and have notably increased national wealth. One way in which a beginning could be made would be to take advantage of the opportunity which the Committee have reason to hope will be offered to them, for individual members to make some special investigations from the ships engaged in the survey or for charging with such investigations medical and other officers employed on the ships. In connection with the hydrographic survey itself, it might be possible to obtain a contoured plan of the sea floor between the coastline and the Outer Barrier Reef as well as vertical sections through the islands, reef, and lagoon in the northern, middle, and southern regions of the reef for comparison with similar sections that may be made at future times, while general information as to chemical composition—especially salinity, temperature, penetration of light, colour, viscosity, and compressibility of the sea water in various parts—might be obtained by observation in the course of the survey and by the collection of samples for subsequent laboratory investigation. It is possible,

also, that the help of the coastal shipping companies might be obtained in connection with temperature, current, and tide observations, while arrangements are already under consideration for regular temperature and some other simple observations to be carried out by volunteers at selected stations along the shore. We want to get to know all about the nature and the movements of the sea water, which no doubt influence the structure, occurrence, and geographical distribution of the coral reefs. In addition to the collection of physical data bearing on oceanography much information may be obtained by medical officers and others on survey and merchant steamers and on the coasts and islands in respect to plankton, &c., with the object of "putting life" into the physical data. A practical scheme in this connection is being elaborated. There has, it is true, already been inquiry into some of these factors in the activity of the coral-building organisms. But lengthy and continuous investigations of this nature are still desirable to verify and extend results already obtained, and it is realised that the sooner we get to work on them the better. The assistance we hope to get from the Royal Australian Navy, from the coastal shipping companies, and from selected observers in our oceanographical research, while it requires arrangement and organisation, will not be dependent on such funds as we can collect. But if our physiographical, geological, biological, and economic investigations are to be carried forward to the point when they will become productive, funds will be necessary. We have had a suggestion made to us that it might be possible to get a grant from the Percy Sladen Trustees in Great Britain or from the British Royal Society Government grant to send out one or possibly two young scientific men from Cambridge who might co-operate with one or two from Australian Universities to make a start on some definite line of investigation. The Barrier Reef Committee is following up this suggestion in the hope that for three or four months of the coming cold weather the study of some special features of the Barrier Reef may be started in this way. For this purpose the funds that have been generously offered by a few citizens of this town with an endowment from the State will probably suffice. The exact nature of the investigation is still for decision, depending as it must do on the special qualifications of the scientists who may be made available and on the conditions that may be imposed by the assisting bodies. I may mention here in connection with the employment of youthful scientists in work

which would both increase their knowledge and develop their power of research that the Professors of Biology and Geology of our Queensland University contemplate visiting in the autumn with their advanced students the Capricorn Group of islands in the southern part of the Great Barrier Reef. Professor Goddard informs me in this connection that in the arranging of biological excursions to the various islands, &c., the idea would be to carry out the work on a thorough, systematic, and—most important of all —ecological basis. At the same time an endeavour would be made to interest residents on the islands in the collection of plants, and in this they would be assisted in every way in respect to equipment, advice, and instruction. I have enumerated the various ways in which we are proposing to make a start with our investigations. These ways have, however, to be co-ordinated and supplemented by some whole-time work which will ensure their continuity and their advance in definite directions. Readiness to co-operate in the oceanographical, physiographical, geological, and biological work of the Committee has made itself manifest by the way the scientific institutions and universities of Australasia are represented on it. But university professors and museum directors are busy men, tied to their chairs and rarely able to devote time for research work outside their State or at a distance from its headquarters. It is for this reason that the Great Barrier Reef Committee feel that the proper progress of their work must depend on the early selection of a Director of their operations, and the Royal Geographical Society of Australasia (Queensland), feeling themselves in a parental relationship with the Great Barrier Reef Committee, are specially interested in that Committee obtaining funds with which to procure the services of an efficient Director. We want for this, and for the special studies I have referred to, at least £5,000, to be spent in the years 1924 to 1929. If we can get half this from private subscriptions, I have no doubt the balance will come from the State Government, always keen in encouraging research likely to be to the permanent advantage of the State.

I have, in the foregoing remarks, laid stress on the Great Barrier Reef investigation, by means of which the Royal Geographical Society, through the Barrier Reef Committee, are doing something to forward the first of the objects of the Society as laid down in its constitution. To be honest, I must now refer to an important matter connected with the study of physical geography about which they are doing nothing. They are doing nothing to secure for the

State a reasonably good map showing its physical features. Such a map with 50-ft. or even 100-ft. contours is necessary if the people of this country are to know what its surface is like and if a more general understanding is to be diffused throughout it of those questions of communication, of irrigation, of cultivation, and of forestry, which are dependent on the features of the earth's surface. At present we have railway maps and property maps. Property and railways are no doubt fine things, but we ought to be able to see from our maps what the country is like in itself, independently of train journeys and station or selection ownership, how its rivers run between the hills and how these form watersheds and water partings, make communications difficult, or give facilities for irrigation. There must be much information, largely in the State Railway Department and the Federal Defence Department, which would serve as a basis for such a map. I am sure it would be welcomed by the teachers all over the State. I remember at one school I visited an attempt had been made to take its place with a clay model, but on this the slopes of the two sides of the Great Dividing Range had been made of similar steepness so that the model only gave the same wrong impression as to this that is given by the school maps across which the Range, "like a wounded snake, drags its slow length along." To secure the preparation of a map showing correctly the physical features of Queensland is one of the many things that the Royal Geographical Society should do in fulfilment of its scientific object of promoting the study of physical geography.

The advancement of the study of commercial geography—of the geographical distribution of products and manufactures—is the second object laid down in our constitution. Something has been done recently in this matter in the State by the University instituting this year a course of thirty lectures in commercial geography as a result of the establishment of a course leading to a diploma in commerce. But I fear the Royal Geographical Society cannot claim credit for this, and generally in the matter of commercial geography they have not done much hitherto, though they are hoping to get results in this also from the Great Barrier Reef Committee. It is essential that there should be prepared careful scientific and economic studies of each commercial product of that reef—of bêche-de-mer, of trochus, pearl and tortoise shell, and of sponges, with an analysis of where the product goes, of whence similar products came from

other parts, of the possibility of extending local production, preparation, and manufacture, and of the marketing conditions in the different countries where the product is purchased. The basis for the solution of all marketing problems is the geographical distribution of production and consumption. We want more collection of economic information as well as original scientific research in regard to these lesser-known Queensland products. Information is no doubt constantly being collected and published by other bodies as regards the geographical distribution of production and consumption of the more widely known produce of Queensland and Australia —wool, meat, tallow, hides, butter, cheese, wheat, cotton, fruit, &c. But it would certainly be a good thing if on these subjects also, including distribution within Australia, we had occasional papers illustrated by charts and diagrams.

This would undoubtedly be educational and that, according to its constitution, is the third object of our Society. The dissemination of knowledge of physical, commercial, and political geography amongst all classes is supposed to be achieved by means of public lectures and publications. We do something in this direction. We aim at having a lecture at each of eight monthly meetings in Brisbane in the year and at each lecture containing original matter, being geographical in a wide sense, and being delivered by a good authority on its subject. We have also created branches where these lectures are repeated or others, preferably having some connection with the locality of the branch, delivered by visitors to, or members of, the branch. Such branches have been instituted or in most cases reinstituted at Ipswich, Toowoomba, and Warwick, at Maryborough, Gympie, and Bundaberg, and quite recently in North Queensland at Mackay, where the presence in September last of members of the Great Barrier Reef Committee and other visiting scientists stimulated interest in geographical science. It is difficult to keep these branches going—to provide lectures that will interest them and to set them work to do that will benefit the country—but with the co-operation of our city members the Council are in hopes of succeeding in this. Another means of attaining the educational object of the Society is, of course, through the Journal, which publishes selected lectures and a few other papers that, from their nature, are less suitable for verbal delivery. The Journal is fair, but the Council admits that there is room for improvement. Where the Society have hitherto failed in the matter of education is that they have, in so far as I am aware, never seriously attempted

to influence the teaching of geography in the schools—at any rate, not since the then and present Honorary Secretary read a paper on the subject thirty-six years ago. The matter was discussed at one of our Council meetings in the past year, and Professor Richards and myself were appointed to go into the whole subject of the possibilities of the film in the teaching of geography in Queensland. To my mind these possibilities are great, ranging from the occasional exhibition of reproductions with the balopticon as now being tried by the Department of Public Instruction through their itinerant teachers in the back parts of the country, to well-planned courses of moving pictures which will carry the students of our big schools, possibly as often as once a week, into the different parts of Australia, showing the natural conditions and the progress of life and industry there, and after that will take them as by steamer, railway, car, and aeroplane up and down the Empire and round the wide world. This special Committee has not yet got to work, its members, I regret, not having had time to give to it. For the moment I am bound to record the important matter of the school teaching of geography as one of those in which our Society have failed to prosecute their aims.

The fourth of these aims is historical, viz., the collection and publication of historical records of geographical interest. In that direction the Society are doing work and I can answer for it—at any rate as regards several of its members—hard work. It is being done in conjunction with the Historical Society. In a new country history is largely geographical—for it is the history of the discovery of new features and the settlement of new areas of the land. Both new discovery and new settlement involve new names, often taken from those of the discoverer or settler, from the names of persons connected with him to whom he wished to do honour, or from those circumstances of discovery or settlement which seemed to him worthy of commemoration. Geographical names thus embody matters of historical interest, but unless these are placed permanently and, as far as possible, authoritatively on record the history and the interest will presently be lost. The vast scale on which under the conditions of modern civilisation information is circulated in print has done much to deprive oral tradition of the power it once had to hand down matters by which future generations might set store. Besides this, a new nation starting under modern conditions is careless of accuracy in things not material, and due to original carelessness and later ignorance names get changed and

their meaning presently lost. Named 150 years ago, Hinchinbrook has long lost its final "e" and Moreton gained its middle one. To names of Scottish origin are attributed an English derivation and the other way round, and in the explanation of Queensland place-names errors are introduced into the geography of the British Isles. The story involved in aboriginal names is even more easily lost—some of them have been wilfully changed for reasons of fancied euphony. Many were misheard originally and their application misunderstood, and apart from these difficulties the temptation of those who know a few of the many native languages which used to be spoken in the north-eastern part of this continent to apply their knowledge a little too generously to the elucidation of our soft-sounding place nomenclature, though wholly laudable, leads at times to strange error. We shall never now get a complete and correct account of the origins of the place names of Queensland, but we are more likely to approach completeness and accuracy at the present time, while there are still a few early settlers and a few aborigines with us, than will ever be the case in the future. I hope, therefore, that the compilation now being carried out by this Society in conjunction with the Historical Society will, while I am still in the State, reach the stage of a preliminary issue on which criticism will be invited and, I confidently predict, will be generously or at any rate freely given. The work is progressing slowly but at an accelerating rate. We have information more or less complete with regard to some 1,500 names, and workers in this attractive field are growing more keen and more numerous.

I have mentioned the aboriginal languages of which the use and knowledge are fast dying out. So are aboriginal customs and the knowledge of them. In a few more years there will scarce be means of adding to this knowledge. The Royal Geographical Society have in the past done their duty in the matter of helping to preserve information about the Queensland aborigines. I refer to the numerous and learned papers by Mr. R. H. Mathews that appear in the Society's Proceedings over a period of twenty-five years. Latterly this part of our work has not been followed up. I hope it will be possible for the Society to get further papers in the matter read to them during the short remaining time when first-hand knowledge will be obtainable. That that time is not yet quite over I know from correspondence I have recently had with Mr. E. Armitage, of Maryborough, that has resulted in gramophone

records being obtained of the death wail of the Wide Bay blacks and of one of their corroborees, which records I hope it will be possible to make permanent.

While I am making a clean breast of the matters in which the Royal Geographical Society of Australasia (Queensland) are not doing all that the Council would have them do, I must refer to the library, which is not in the good order in which it should be. This is partly, but only in part, due to the recent curtailment of the space allotted to us by the Government in order to provide a room for the preservation of fish specimens and for the meetings of amateur fishermen. New shelving has been provided in our shortened premises and made available elsewhere for our books, and a member of our Council is very kindly busying himself with getting them into order. But assistance is required in this and in making a proper library catalogue. The appointment of an honorary but working librarian will presently have to be considered by the Council, who want the valuable collection of books and periodicals possessed by the Society to be more easily and conveniently available to members, as well as to make the Society's room a more agreeable place than it is at present in which to study and to meet.

I wonder, as I call for new workers, whether the Society realises how much its existence has been dependent in the past on the exertions of one man. It is over thirty-eight years since it was formed, mainly at Dr. Thomson's instance, he being the first Honorary Secretary and Treasurer, and, except for the sessions 1894-5, 1895-6, when he was President of the Society, he has been Honorary Secretary ever since, and for most of the period he has been Honorary Treasurer as well. He has contributed not only more papers to the Society than any other person, but it is scarcely exaggeration to say that at any rate in the Society's early years he contributed a large, if not the larger, proportion of them. We must not count on this going on. Though his energy may be as great as ever, it is not fair that we should go on making calls on it as has been done in the past. Besides, and I am sure he will forgive me saying it, it is not in the best interests of the Society, or indeed any society, that its existence should be dependent on any single man. I have endeavoured, since I have been connected with the Society, to help him carry the burden, but I am only here for a time. What we must have is more work from some existing members of the Society and many new members who will work to

promote its objects. We want, first of all, the fullest possible support, and I am glad to say this is coming, in an increasing measure, from the staff of the University. It is they who to a special degree are in a position to give us here in Brisbane, and also to the branches in the districts, these original addresses on subjects geographical or akin to geography that it is the special function of the Society to provide, or to furnish us with papers for our Journal of the more recondite nature that is suitable for its pages. We want, also, business men and others to come forward with papers on the economic subjects I have mentioned. We want to recruit the young University graduates whose interest in science is fresh and who will help on the investigations the Society may originate; we have made a start in this direction in the two young University graduates who are Honorary Secretaries to our Place Names Committee. Especially do we want new members who will make known our aims and contribute to their attainment among the people all over the country. There is no body of persons from whom assistance in this direction could more effectively be obtained than the teachers, and that teachers are well disposed to give this assistance I learnt at the recent meeting at which Mackay became a provincial centre of the Society. As a result of that lesson I have moved the Council to reduce to half the usual amount the annual subscription to the Society of every person who is or has been engaged in the work of teaching in any school or college—State, Grammar, denominational—recognized by the State. This will make it more possible for them to join us, and I appeal to them to do so and, when they have joined, to do their utmost to assist us in our aims. I know that the teachers are a hard-worked body, but my experience is that the men who work hard are those who have the most time for fresh work as well as the alertness of mind that enables them effectively to help it on.

When calling for fresh workers I would add a word with regard to those who have worked for us in the past and will do so no more. It is with feelings of deep regret that we have to include among these the name of Mr. Alexander Muir, who was one of the original members of the Society, an early office-bearer, for many years an Honorary Councillor, and a valued contributor to our Journal. We have also lost Mr. W. G. Johnston, a well-known citizen of Warwick, who enrolled twenty years ago at the inaugural meeting there and was one of the first provincial members of the Society. Among our later supporters who have passed away

are Mr. Charlie McDougall, of Lyndhurst, and Mr. W. A. Dudley Le Souef, of the Royal Gardens, Melbourne. The former was well known throughout the State as much for his delightful personality as for the useful work he did in improving stock; the latter was a famous zoologist whose interesting lecture on the bird life of Australia, given at our rooms some years ago, will no doubt be remembered by some of our members. As by reason of death and other less sad reasons our old members pass away, we fill up the gap in our ranks. As regards numbers, we are doing more than this, the numerical gain of the Society in the last year being over 160 members, mostly representing the provincial centres. We want, however, a corresponding or more than corresponding increase in Brisbane, which necessarily must be the great centre of the work of the Society. I trust that after the exposition of the Society's work that I have given you as frankly as was in my power, the Society will receive this increase in the coming year and will move with greater success to the achievement of those aims that I have rehearsed this evening.

Proceedings of the Royal Geographical Society of Australasia, Queensland.

THIRTY-EIGHTH ANNUAL GENERAL MEETING, 30th NOVEMBER, 1923.

His Excellency Rt. Hon. Sir Matthew Nathan, G.C.M.G., F.R.G.S., President, in the chair.

The minutes of the previous monthly meeting of the Society were taken as read and duly confirmed.

The Hon. Secretary read the Report of Council, accompanied by the Financial Statement for the year, both of which were approved and adopted.

An extract from a letter addressed to Dr. Thomson by Mr. W. H. Rudd, of Rockhampton, was also read as follows:—

> "In further reference to our conversation in Rockhampton, I have now pleasure in enclosing you a cheque for £50 which can be used to further the interests of the Royal Geographical Society and to be entirely at your disposal to utilise in any way you think best, and I trust you will have a successful meeting and that the good work will long continue under your able management."

The officers and Council were then elected for the Session 1923-24, as follows:—

Patron:

His Excellency Rt. Hon. Lord Forster, G.C.M.G., Governor-General, &c.

Vice-Patron:

Rt. Hon. W. M. Hughes, K.C., &c., former Prime Minister.

President:

His Excellency Rt. Hon. Sir Matthew Nathan, G.C.M.G., F.R.G.S., &c.

Vice-Presidents:

His Grace Archbishop Duhig, D.D., &c. Hon. J. Huxham, M.L.A.
Hon. W. F. Taylor, M.D., F.R.G.S.A.

Hon. General Secretary and Treasurer:

J. P. Thomson, C.B.E., LL.D., Hon. F.R.S.G.S. (Edin.).

Council, 1923-1924:

F. B. Campbell Ford, Esq., F.R.G.S.A. Prof. H. C. Richards, D.Sc.
Prof. E. J. Goddard, B.A., D.Sc. G. W. Whatmore, Esq.
A. Hertzberg, Esq. L. A. Wilkinson, Esq.
W. Moffitt, Esq.

The President then delivered the Anniversary Address. (Page 89.)

The vote of thanks to the President was moved by Prof. Goddard, seconded by Mr. Christy Freeleagus, supported by Dr. Thomson, and carried by acclamation.

ANNUAL SUMMARY.

1. In summarising the work of the thirty-eighth session, the Council feel gratified in being able to report that the increase of membership and the extended development of the Society's activities, to which reference was made in the 1922 Summary, were fully sustained during the year now ending. Including the Provincial Branches, there are on the roll 539 subscribers, 10 honorary members, and 21 honorary corresponding members, making in all a grand total of 569, this being the largest membership of any scientific body in Australasia.

2. During the year the number of provincial branches was increased to seven by the establishment of one at Mackay on the 7th November.

3. The following Addresses were delivered during the Session at the Headquarters of the Society in Brisbane:—

(i.) "Birds-Eye Mapping," by Mr. E. C. Barton, F.R.G.S.

(ii.) "Corals," by Professor F. Wood Jones. Joint Meeting of the Royal Society of Queensland and the Royal Geographical Society of Australasia, Queensland Branch.

(iii.) "A Queensland Geological Pot-Pourri," by Mr. B. Dunstan, Chief Government Geologist.

(iv.) "The Origin and Significance of the Deep-Sea Fauna," by Professor E. J. Goddard, B.A., D.Sc.

(v.) "Queensland Highways," by Mr. J. R. Kemp, Chairman, Main Roads Board.

(vi.) "The Desert Peoples of Central Asia," by Professor Ellsworth Huntington, Yale University, U.S.A.

(vii.) "Geographical Discovery as the Basis of Territorial Right," by Dr. F. W. S. Cumbrae Stewart, B.A., Registrar, Queensland University.

(viii.) "A History of the Theory of Gravitation," by Professor H. J. Priestly, M.A., Queensland University.

4. At the provincial centres the President repeated his Brisbane addresses of the previous years on "Maps and Discoveries before the Dutch" and "Dutch Discoveries in Australia," and the following were also delivered:—

(i.) "The Orkneys and Shetlands," by Dr. J. P. Thomson, C.B.E., at a Provincial Meeting, Toowoomba.

(ii.) "The Pacific Islands," by Dr. J. P. Thomson, C.B.E., at a Provincial Meeting, Warwick.

(iii.) "West Moreton as a Tourist Resort," by Mr. R. A. Wearne, B.A., at a Provincial Meeting, Ipswich.

5. The Society continued to be represented on and to give their full support to the Great Barrier Reef Committee during the year. A paper on "The Physiography of the Fitzroy Basin," presented to that Committee, is

printed with the Society's Proceedings, as is also a "Report on the Great Barrier Reef of Australia—Series I.," submitted by Professor H. C. Richards, D.Sc., and Mr. Charles Hedley, F.L.S., on the 13th July, 1923. *See* page 105.

6. The Joint Committee of the Royal Geographical Society of Australasia (Queensland) and the Historical Society of Queensland, on the origin of Queensland place names, referred to in the last Annual Summary, continued their labours during the year; copies of their first, second, and third interim reports are also published in the Proceedings. *See* pages 110, 113, 115.

7. The annexed Balance Sheet, duly audited (*see* page 104), shows a credit balance of £125 16s. 6d. From this the cost of printing the last issue of the Journal has to be deducted to show the actual financial position of the Society at the close of the year.

8. The Council recommend to the Society—

(i.) That so much of the "Rules" be suspended as provides for the payment of an entrance fee.

(ii.) The reappointment of Major A. J. Boyd (Fellow) as Honorary Auditor and Mr. H. W. Mobsby as Honorary Lanternist, and the appointment of Mr. Hugh Macintosh as Honorary Librarian.

(iii.) The reduction to half the usual amount of the annual subscription to the Society of every member of it who is or has been engaged in the work of teaching in any School or College—State, Grammar, Denominational—recognised by the State.

STATEMENT OF ACCOUNTS

From 1st July, 1922, to 30th June, 1923.

Dr.	£	s.	d.	£	s.	d.
By Funds at close of last Accounts—Balance in Commonwealth Savings Bank				50	6	4
„ Subscriptions Received	394	8	0			
„ Forestry Association, one-third share of cost of cleaning rooms and for use of chairs	3	1	0			
„ Authors and Artists' Association, one-third share of cost of cleaning rooms and for use of chairs	3	8	0			
				400	17	0
„ Interest on Commonwealth Savings Bank Deposit ..				3	19	7
				£455	2	11
Cr.						
To Expenditure as per Accounts—						
Gas	2	6	2			
Fire Insurance Premiums	3	1	4			
General Printing	22	8	9			
				27	16	3
„ Advertising	5	10	7			
„ Cleaning	12	2	0			
„ Expenses of Meetings, Post Cards, &c.	35	7	3			
„ Repairs of Lighting Fixtures	2	15	9			
„ Typing and Clerical	13	12	3			
„ Honorary Secretary	150	0	0			
„ Lantern slides, &c.	7	14	5			
„ Telephone	6	11	0			
„ Lecturers' Expenses—Sydney-Brisbane	10	3	0			
„ Barrier Reef Committee	2	2	0			
„ Incidentals—Engrossing, &c.	7	16	2			
„ Travelling Expenses, Provincial Meetings—Ipswich, Toowoomba, Warwick, Gympie, Maryborough, Bundaberg (two months) ..	18	12	6			
„ General Postage	28	2	3			
				300	9	2
„ Exchanges on Cheques				1	1	0
„ Balance in Commonwealth Savings Bank				125	16	6
				£455	2	11

J. P. THOMSON,
Hon. Secretary and Treasurer.

11th July, 1923.

Examined with Vouchers, Bank Pass Book, &c., and found correct.
(Signed) A. J. BOYD, Hon. Auditor.

11th July, 1923.

REPORTS.

The Great Barrier Reef of Australia.*

I.

Report submitted by Professor H. C. Richards, D.Sc., and Mr. Chas. Hedley, F.L.S., to the Great Barrier Reef Committee, 13th July, 1923.

Introduction.

The following account of our recent investigations in the Barrier Reef regions during a period of about five weeks is of a general nature only, for it is our intention, at a later date, to publish, through the usual scientific channels, the detailed account of our scientific inquiries and the conclusions we have formed with respect to them.

The regions between Sandy Cape and Cairns being traversed by coastal steamer, were considered only in a very general way, and our energies and time were devoted particularly to the least known portions of both the Great Barrier Reef and the coastline—namely, those portions between Cairns and Thursday Island.

Through the courtesy of the Commonwealth Light House Service, we were accommodated on the T.S.S. "Karuah," and every facility for carrying out our inquiries was afforded to us.

Four weeks under ideal weather conditions were spent in these observations, numerous coral cays and reefs being visited and examined; while special attention was devoted to the mainland and its islands of continental rock because they hold the key to our proper understanding of the foundation of the reef.

Time did not allow us to visit the Outer Barrier, but the following coral islands were visited and closely inspected:—

Low Isles, near Port Douglas, Lat. 16° 23′ S.;
Coquet Isle, in the Howick Group, Lat. 14° 32′ S.;
Pipon Island, near Cape Melville, Lat. 14° 8′ S.;
Hannah Reef, Lat. 13° 52′ S.;
Morris Island, Lat. 13° 30′ S.;
Heath Reef, Lat. 13° 28½′ S.;
Tih Tih Reef, Lat. 13° 09′ S.;
Chapman Island, Lat. 12° 53′ S.;
Piper Island, Lat. 12° 15′ S.;
Hannibal Island, Lat. 11° 36′ S.;
Cairncross Island, Lat. 11° 15′ S.

* The report has been slightly amended in its published form. It is the first of the series that will be published for the Great Barrier Reef Committee by the Royal Geographical Society of Australasia, Queensland.

The following points on the mainland, or high coastal islands near the mainland, were examined:—

Island Point at Port Douglas, Lat. 16° 29′ S.;
Cooktown, Lat. 15° 27′ S.;
Stanley Island, in the Flinders Group, Lat. 14° 11′ S.;
Restoration Rock and Restoration Island, Lat. 12° 37′ S.;
Clerke Island, near Cape Granville, Lat. 11° 59′ S.;
Albany Rock, Mai Island, Albany Island, Lat. 10° 44′;
Eborac Island, off Cape York, Lat. 10° 41′ S.;
Thursday Island and its surrounding islands;
Booby Island, 20 miles west of Thursday Island.

Coral Cays and Reefs.

Much variety in the form and size of these was seen, and much enlightenment as to their development was obtained.

The general observations made by Professor F. Wood-Jones,* as to the variation of the same species of coral under different conditions, were fully borne out by our inspections.

We are able to reaffirm strongly the hypothesis put forward by Hedley and Taylor in 1907,† as to the part played by the prevailing south-east wind in developing the forms of coral débris along stream-lines directed more and more parallel to the direction of the wind as they are driven from the point of growth.

Close observations were made as to (*a*) the solidification of loose coral débris into a matted coral mass and ultimately a compact coral rock, and as to (*b*) the subsequent solution and disruption of the coral rock by wave action.

The modifications of the various accumulations of coral material were sedulously studied, and the method of the infilling of the lagoon areas was also closely considered.

The part played by the mangrove screen in protecting tree-covered "islands" of coral rock and sand was manifest, and the baneful effects of the removal of the black mangrove barrier on Hannah Island by a cyclone some years ago furnish an eloquent example of the need of preserving these growths from human destruction, to which they are now subjected in certain regions.

In view of the assertion by Agassiz‡ that recent elevation was demonstrated by "niggerheads," the latter were attentively scrutinised. Such blocks were usually formed of a single great colony and were perched loosely on other blocks, so that we are firmly convinced that they are masses of coral torn off the growing reefs during hurricanes and flung up on the top by the force of the storm. Several very large ones were noted and measured. It is noteworthy that in all regions examined, the niggerheads were pronouncedly on the N.W. and N. sides—those sides most affected by the hurricanes.

* "Corals and Atolls," London, 1912.

† Proc. Austr. Assn. Adv. Science, 1907, pp. 397-413.

‡ Bull. Mus. Comp. Zool. Harv., April, 1898.

Coast, High Coastal Islands and Continental Shelf.

The general impression of a foundered coastal region parallel to the whole length of the Great Barrier Reef is very distinct, and we have no doubt that many coral reefs between the Outer Barrier and the coast have been built upon one-time elevated regions now submerged.

All transitions from high coastal islands such as Restoration Island, with its fringing reef to coral islands without any terriginous material, may be seen.

The foundered coastal strip had been eroded no doubt into hills and valleys; the various islands with fringing reefs and the several coral cays in the lagoon area mark fairly well the positions of the elevated regions, while the present channels of navigation through the inner passage mark the trend of the valleys in the foundered region.

One notes with interest that the sailors' adage of "Steep coasts have deep water" does not hold.

The areas near Cairns, Princess Charlotte Bay, and Cape York are regarded by us as being key areas to the understanding of the foundering movements. The first area being the most accessible is more or less understood, but the opportunities of closely studying the other two were availed of, and our views on the parts they played will be set out in detail in a subsequent publication.

From Sandy Cape to Cape Capricorn there is a complete absence of high offshore islands; moreover the immediate coast shows evidence of recent small elevation following upon the considerable depression general along the Queensland coast. The continental shelf is here contracted, and earthquake shocks have recently emanated from movements within the region.

From Cape Capricorn to Gloucester Head (Lat. 19° 59′ S.) marked evidence of subsidence exists in the form of peaks of drowned mountain ranges—especially about the Whitsunday Passage. Secondly, one sees in this part of the coast steep and high promontories which narrowly avert separation from the mainland by low-lying regions parallel to their length; and thirdly, this area faces the greatest width of the continental shelf along Eastern Australia.

From Gloucester Island to Magnetic Island (Lat. 19° 11′ S.)—a stretch of about 100 miles—the coast is devoid of high islands.

The high offshore islands are renewed at Magnetic Island and continued through the Palms, Hinchinbrook, &c., up to Fitzroy Island, near Cairns. The latter part of this stretch is occupied by the remarkable and steep Bellenden-Ker Range and the recent volcanic outpourings on the Atherton Tableland.

From Cape Grafton (Lat. 16° 52′ S.) to Cape Melville (Lat. 14° 10′ S.) we have a region characterised by high rugged country with steep seaward slopes and with the narrowest continental shelf. Here high islands are few and widely spaced.

From Princess Charlotte Bay to New Castle Bay the coastal relief is moderate, and diminishes to very little as one goes further northwards. A prominent feature is the development of a succession of bays, with a wide opening to the north and a southern boundary along an east-and-west line. The high islands are small and evenly distributed and chiefly associated with

the granitic headlands. The continental shelf is especially noteworthy, being extremely narrow near Capes Melville and Direction, and beyond the latter it rapidly broadens, following a line divergent from that of the coast and joining the broad, flat New Guinea Shelf.

The Torres Strait region presents a marked contrast to the preceding one, and it has features somewhat similar to those of the Hinchinbrook and Whitsunday Passages.

The region is one of considerable relief, and has apparently resulted from a series of fractures along two lines at right angles to one another. It is highly probable that there is a causal connection between these fractures and the Tertiary fold mountains of Papua.

The Continental Shelf has been pierced at Murray and Darnley Islands by volcanic forces resulting in well-developed craters.

Bramble Cay, which is essentially of volcanic origin, is the northern terminus of the Great Barrier Reef beyond which all coral growth is inhibited by the muddy waters of the Fly River.

Earth Movements.

Although it is generally known that the whole of the Eastern Coast of Queensland has suffered a series of foundering movements, the fracturing that took place about Princess Charlotte Bay and Cape York has not, we believe, been closely studied previously. In the latter place evidence of a slight uplift since the main downward movement was obtained.

A slight final elevatory movement has previously been noted from Keppel Bay, Hervey Bay, and other points of the coastal regions, and with a view to determining when these uplifts took place it is suggested that careful search for shells along the old strand lines be made.

It is not improbable that evidence of a one-time warmer climate may be derived therefrom, and if so it would have a bearing on the one-time further southern extension of the Barrier Reef.

Openings through the Outer Barrier.

These have been regarded by Jukes, Saville Kent, and others as marking the old entrances to the sea of the present coastal rivers. This attractive hypothesis does not bear close scrutiny, for by drawing in the contour lines from the soundings in the Admiralty charts no causal connection may be seen between these openings and the present rivers, nor may one find any evidence of defined valleys through the lagoon area corresponding in any way to the coastal rivers.

We prefer to associate these openings with the coastal valleys of the foundered strip on the edge of which now exists the Great Barrier Reef. It does not follow that each valley marked a pronounced stream channel, and it is not unlikely that the drowned valleys have been silted up to a considerable extent. As a result one cannot expect to trace their form by means of soundings.

The sediment from the coastal streams being deposited in the lower depths of the drowned regions would inhibit coral growth.

Following upon this, one would expect to find not only openings in the Outer Barrier but openings or channels should be developed between the reefs which have grown up on the submerged peaks and ranges in the foundered area. This is found to be the case if one peruses the charts.

One may use these facts as criteria in testing the thickness of the coral mass.

If the thin veneer as postulated by Agassiz be correct, the river channels which existed should be still apparent from the sounding records.

If, on the other hand, one accepts Davis's conception as to the origin of the reef and its great thickness, there should not be any relationship between the contours of the reef and the surface contours of the coastal regions.

The non-correspondence of Barrier Reef and coastal contours in our opinion supports the idea of a thick coral mass and of an entire remodelling of the Continental Shelf.

Commercial Aspects and the Marine Biological Station.

Every opportunity of discussing the pearl-shell, bêche-de-mer, and trochus industries was taken at the various places visited, and especially at Thursday Island.

At the latter place much information was gained by discussion with representatives of the Wyben and Wanetta Pearling Companies. Information as to experiments in pearl-shell culture was furnished to us and the difficulties in this connection pointed out.

It was stated that certain pearling grounds, which before the war yielded but five tons of shell per annum per lugger, after being unworked for some years now yield the same quantity in three months. This indicates a natural restocking of grounds more or less worked out. Other informants mentioned the desirability of restricting the size of trochus shell taken. We were pleased to note that on many of the reefs visited live trochus of small dimensions was quite abundant, indicating that the reefs become naturally restocked. We gathered from our informants that bêche-de-mer also naturally restocks grounds from which it has been much impoverished by removal.

While it is pleasing to have evidence of a natural restocking of these three materials of economic importance, we feel that every endeavour should be made to ascertain, as fully as possible, the best methods of aiding this restocking and of securing a more reliable and copious harvest.

The question of establishing a Marine Biological Station naturally concerned us a great deal, and we feel that Thursday Island would be the best location for such.

The suitability of Townsville—especially in view of the proffered help of the Director of the Institute of Tropical Medicine—for the station was carefully considered by us, but the material for investigation is much more accessible at Thursday Island, and moreover it is the focus of the various industries concerned, so that we feel that Thursday Island would be the more suitable.

Phosphatic deposits in any quantity were not observed by us on any of the islands, nor did we hear of any fresh important sources of this material.

First Report of Committee on Queensland Place Names for Period to March, 31st, 1923.

On 24th July, 1922, a meeting, convened by His Excellency Sir Matthew Nathan, President of the Royal Geographical Society (Queensland) and Patron of the Historical Society of Queensland, was held in the rooms of the Royal Geographical Society, Public Library, William street, Brisbane, for the purpose of forming a Committee to prepare a full and accurate account of the names of the places and natural features of Queensland.

Efforts had previously been made by the Government and by private individuals to collect information on this subject, but the work done was spasmodic and no attempt had been made at a general collection for the whole State.

The task of preparing an index of the names of Queensland places and ascertaining their origin, meaning, and history is one calling for sustained research, the co-ordination of the results of that research and the application of historical and linguistic criticism before there can be any possibility of arriving at accurate conclusions. This is beyond the powers of any private researcher. The Royal Geographical Society (Queensland) and the Historical Society of Queensland therefore agreed to united action and appointed representatives to attend the meeting called by His Excellency to form a Place Names of Queensland Committee.

The Committee appointed consisted of:—

His Excellency Sir Matthew Nathan, G.C.M.G. (Chairman).

Dr. F. W. S. Cumbrae-Stewart, President of Historical Society of Queensland (Vice-Chairman).

W. J. Gall, Esquire, Under Secretary, Home Secretary's Department.

A. G. Melville, Esquire, Under Secretary, Department of Public Lands.

A. S. Kennedy, Esquire, Acting Under Secretary, Department of Public Instruction.

Dr. J. P. Thomson, C.B.E.,
Hugh Macintosh, Esquire,
Henry Tryon, Esquire, } Royal Geographical Society (Queensland).

Professor H. Alcock, M.A.,
Charles Schindler, Esquire, M.A.,
A. E. Palfery, Esquire, M.A. (Secretary of the Committee), } Historical Society of Queensland.

The Committee determined upon the following procedure in order to conduct a systematic campaign and, by enlisting the services of as many interested persons as possible, to gather information from all quarters of the State.

That the Local Authorities and Head Teachers of State Schools throughout Queensland should be requested to obtain the information desired from old inhabitants, aboriginals, and persons having acquaintance with the aboriginal languages, and other persons who have devoted themselves to acquiring such information. It was thought advisable that the request to Local Authorities should go from the Home Department, and that to State School teachers (who

were requested to supply information through the Local Authorities) from the Department of Public Instruction. To this effect a draft letter (Appendix I.)* and Schedule (Appendix II.), with a note on the system of orthography used in recording the aboriginal language, were forwarded by His Excellency to the Home Secretary and the Secretary for Public Instruction, with a request to circulate them among the Local Authorities and State School Head Teachers. This was done, and the various Local Authorities within whose areas there is a local Press were advised to avail themselves of such assistance as could be thereby afforded, especially by the publication of the letter of request, so that persons having special information might send it to the Town or Shire Council Clerk.

Copies of the draft letter and schedule referred to were forwarded to the Mayors of Cities and Towns, with a request to furnish information regarding the names of streets, parks, and other places and sites connected with the history of their municipalities. In the case of urban authorities the necessity of exercising discretion in dealing with the names of streets was pointed out, since only those were required of which some historical origin could be traced. Newspapers were asked to publish copies with a view to securing the co-operation of the public in furnishing further information. The Local Authorities were requested to send in their replies to the Secretary before the 31st December, 1922.

In the meantime the members of the Committee agreed to collect whatever information they could. A careful search was made through accounts of the voyages and expeditions of early navigators and explorers; records of the early settlement of various localities; newspaper cuttings; records of the personal reminiscences of pioneers; and the very few histories of the State of Queensland. In this respect a considerable amount of valuable information was obtained by the painstaking work of Miss E. Campbell, B.A., who devoted considerable time to this arduous task.

In addition, Miss Campbell tabulated the information supplied by the various Local Authorities.

The following Local Authorities responded to the appeal and furnished information on the origin of place names within their boundaries:—

Bundaberg City Council.
Burke Shire Council.
Cambooya Shire Council.
Croydon Shire Council.
Flinders Shire Council.
Ilfracombe Shire Council.
Isisford Shire Council.
Rawbelle Shire Council.
Wangaratta Shire Council.
Normanby Shire Council.
Calliungal Shire Council.
Livingstone Shire Council.

It is a matter for regret that the response was such a poor one. The replies received represent a very small percentage of the Local Authorities of

* Not printed.

the State. The fact that none of the large cities and towns responded is particularly to be deplored, since their local newspaper facilities afforded them a unique opportunity of bringing the matter before the public. Moreover, the replies received differed widely, both in quality and quantity. The number of place names, of which some account was forwarded by the Local Authorities, is as follows:—

	Names.
Bundaberg City Council	17
Burke Shire Council	1
Cambooya Shire Council	5
Croydon Shire Council	8
Flinders Shire Council	95
Ilfracombe Shire Council	1
Isisford Shire Council	1
Rawbelle Shire Council	17
Wangaratta Shire Council	23
Normanby Shire Council	14
Calliungal Shire Council	5
Livingstone Shire Council	34

These results, however, do not afford a just criterion of the relative effort made by each of the above Shire Councils. Letters were sent to many old residents and to others who might reasonably be expected to be cognizant of the origin of many local names, but in most cases no information was forthcoming. Flinders Shire Council furnished much valuable information mainly through the splendid assistance afforded by Mr. J. M. Chisholm, of Stanley Downs, Townsville, a former resident of the district, and one who takes a keen interest in matters of this nature. The result of his research work, published in the "Flinders Chronicle" of 12th January, 1923, affords most interesting reading, and Northern residents may congratulate themselves upon possessing such an enthusiastic researcher. Other assistance invoked by the same Shire proved less reliable, for "although about fifty letters have been sent to the various lessees of land in the Shire, only three replies have been received."

Mention must also be made of the work of Mr. A. J. Stower, Head Teacher of the State School at Hughenden. The origin of the name "Hughenden" was traced, and the native name which it superseded; an account of the early history of the town and district was given, as well as the origin of the names of the chief streets.

From the general tenor of the remarks made by the Local Authorities who forwarded replies, it would appear that the disappointing nature of the returns was due to lack of interest in the subject on the part of local residents; that many of the early residents were dead and that others had left the district. There was noticeable also a tendency to regard the present inquiry as being too late to accomplish its design, and that in order to be effective it should have been made at least thirty years ago. But this ignores the fact that there are still living amongst us many of the old pioneers of over half a century ago: further, many of the settlements of Queensland are of comparatively recent date, and place names are being conferred from day to day. Aboriginals are still numerous in many parts of Queensland and are not widely migratory. Even if the origin of the European name could not be traced, the aboriginal

name of the locality with its meaning could in many cases have been given. It should have been borne in mind that reliable information, however scanty, should be given, for others may be able to furnish the missing particulars.

Fancied incompetence to deal effectively with the task was probably the deterrent in most cases. While the field covered is large and the total place names of even one shire amount to a considerable number, yet the number of places bearing names of historical importance and general interest is not as large as was apparently imagined. Grouping of names was possible in many instances, *e.g.*, the street names of Nymbool, a small mining settlement in the Herberton district, are names of trees, such as, Wattle, Cypress, etc. In the case of Mount Garnet (in the same district) the street names are those of precious stones. Other instances of similar treatment could be given.

Inclusive of the work of the individual members of the Committee, the origin of approximately 400 names has been determined.

The work of the Committee is by no means near completion. Replies are still being received and letters have been sent to private individuals known to have such work at heart, from whom considerable information may yet be gathered. Much yet remains to be done before the results would justify publication of a brochure on the place names of Queensland.

A. E. PALFERY, Hon. Secretary.

Second Report of Committee on Queensland Place Names for Period 1st April to 30th September, 1923.

Since the Committee on Place Names, set up by the Royal Geographical Society of Australasia (Queensland) and the Queensland Historical Society in July 1922, last reported at the beginning of April, the members and Honorary Secretaries have been steadily pursuing the objects of the Committee in collecting, verifying, and recording on a common form the meaning, origin, and history of the names of Queensland natural features, administrative divisions, urban areas, and pastoral properties. Progress would have been more rapid but for a certain indifference of Local Authorities and individuals to work from which they can see no material benefit likely to arise.

Of the 134 Shires in Queensland, the following 19 only have responded to the appeal made to them to supply information on the origins of place names within their boundaries:—

Aramac
Burke
Burnett
Calliungal
Cambooya
Croydon
Dalby
Diamantina
Flinders
Ilfracombe
Inglewood
Isisford
Livingstone
Normanby
Rawbelle
Tambourine
Thuringowa
Wangaratta
Yeerongpilly

These Shires have furnished 240 names. The best list received in the half-year since the last report was from Yeerongpilly, with 25 names, largely the work of Mr. Robert W. Ferguson, of Salisbury, South Coast Line. Generally the quality of the information furnished is similar to that referred to in the previous report.

Of the 36 Municipal Authorities, the Bundaberg City Council has supplied, as previously reported, a list of seventeen names. Through the courtesy of the Mayor of Cairns the Committee have been informed of the name-origin of sixty streets in that city.

During the Governor's tours in North and Central Queensland in May and June an attempt was made to arouse interest on the part of local officials and private citizens in Chillagoe, Herberton, Atherton, Innisfail, Ingham, Townsville, Proserpine, Home Hill, Charters Towers, Hughenden, Longreach, Rockhampton, and Maryborough. Lists of leading place-names were distributed in some of the shires and promises of assistance were obtained; in some cases these resulted in useful information, *e.g.*, from Mr. W. Atherton of Chillagoe, Mrs. L. E. Garbutt of Torrens Creek, Mr. F. S. Grant of Mandalee, and Mr. J. R. Wilson of Frewhurst. Mr. Edward Armitage, of Maryborough, has furnished the Committee with interesting facts with regard to aboriginal names in that district, and Mr. J. R. Chisholm has continued the assistance that was acknowledged in the last report. Mr. W. H. Corfield has also shown interest in the Committee's work. The Moderator-General of the Presbyterian Church of Australia, the Rev. John Mathew, gave some valuable information to the Chairman on aboriginal names in the Wide Bay district.

Through the courtesy of Mr. G. R. Steer, the Queensland Railway Department have supplied the Committee with a list of all names given to railway stations throughout Queensland since February, 1914, when a list of all stations with short notes on their origins was published. The information supplied by the Department corresponds as nearly as possible to the form adopted by the Committee.

During the half-year, circular letters were issued by Mr. Gall, Under Secretary, Home Office, to owners of pastoral properties, grazing selections, &c., asking for the information with regard to these required by the Committee. A large number of replies were received, and although in a number of cases they contained little or no information, in about 450 the facts as stated will be useful for embodiment in the catalogue that will be prepared.

As regards the names of natural features and of towns and townships, the most fruitful source has been found to be the careful study of the accounts of explorers and settlers contained in old books and reports. The Chairman, members of the Committee, and the Honorary Secretaries are engaged in working through such books and journals as they may possess or can procure from each other or from the public libraries. A list of books already examined is attached.

The information from all these sources, except the reports from pastoral holdings, grazing selections, &c., has been embodied as it was received on cards by the Honorary Secretaries, 1,000 of such cards having been filled in. On completion they are submitted for scrutiny to a sub-committee consisting of Dr. F. W. S. Cumbrae Stewart, Messrs. W. J. Gall, H. Macintosh, and C. Schindler.

In June last the Committee were informed that on the suggestion of His Excellency the Governor-General, the Commonwealth Government had decided to issue instructions to the Administrators of the Northern Territory and Norfolk Island to take the necessary action to have compiled an index of place names in those territories on the lines followed by the Queensland Committee.

During the half-year dealt with in the present report the membership of that Committee has remained unaltered. Mr. A. E. Palfery, finding it impossible to spare the necessary time from his duties in the Department of Public Instruction to carry out those of Honorary Secretary to the Committee, has had to resign that position. He has, however, kindly consented to continue to supervise the preparation of lists of place names in the different Shires and to issue them to members of the Committee and to others who wish to receive them in order to assist the Committee in their work.

Miss D. K. Denniss and Miss E. Campbell, graduates of the University of Queensland, are now the Honorary Secretaries. Their address is:—The Royal Geographical Society of Australasia (Queensland), at the Public Library, Brisbane.

MATTHEW NATHAN, Chairman.

30th September, 1923.

Third Report of Committee on Queensland Place Names for Period 1st October to 31st December, 1923.

Since the last report of the Committee, issued on 30th September, the work of collecting and recording information concerning the meaning, origin, and history of Place Names has been continued and some fair progress has been made.

Two more Shires (Goolman and Johnstone) have forwarded lists containing fifteen and twelve names respectively. The former list is the work of Mr. J. Hardcastle, of Boonah, and its information is full and accurate. A further list is being prepared by the same gentleman. Mr. Ferrier, Shire Clerk at Innisfail, forwarded the Johnstone Shire list in response to a request made to him at the time of the Governor's tour in North Queensland in May last. The total number of Shires that have responded to the appeal for assistance up to date is twenty-one, out of 134, and the number of names furnished by them is 270.

Members of the Committee, including the Chairman with 125 names gathered from various sources, and a few private individuals, have sent in lists. Miss Grace Deshon, of Mitchell Downs, collected information with regard to one hundred names in South-Central Queensland. Miss Hannah, Secretary to the Hon. J. G. Appel, has forwarded information dealing with thirty names in various localities. Mr. Thomas Hall, of Warwick, has given accounts of the naming of thirty-five places, all in the Inglewood Shire, and going back to the early days of the settlement of the Downs.

Through the courtesy of Mr. G. R. Steer, the Railway Department has continued to supply the names of new railway stations, with the reasons that have led to their adoption, and also to notify changes in names already attached to stations.

Several lists of aboriginal names with their meanings have been received, the chief contributors being the Very Rev. John Mathew (who supplied a list of one hundred native names), Mr. W. Bevington (who sent in one of fifty names), and Mr. Armitage, of Maryborough. A list of the names of the natural features of Dunk Island, prepared by the late Mr. E. J. Banfield, was made available to the Committee through the Chairman. Mr. J. A. Edwards, of Mackay, has sent in some meanings of aboriginal words. These lists have been submitted to Mr. C. Schindler, of the Revision Subcommittee, for examination and verification.

The Revision Subcommittee have continued their work of checking and correcting information already recorded, and for this purpose the Survey Department, through Mr. McIntosh, has supplied them with a set of "4-inch" district maps of Queensland.

So far 1,450 cards have been filled in, but there is much further information in the hands of the Hon. Secretaries awaiting entry.

Additional works have been examined for the purposes of the Committee by the Chairman, members, and hon. secretaries. The complete list of the books so examined is appended.

There has been no alteration in the constitution of the Committee. The address of Miss D. K. Denniss and Miss E. Campbell, Hon. Secretaries, is:—The Royal Geographical Society of Australasia (Queensland), at the Public Library, Brisbane.

MATTHEW NATHAN, Chairman.

31st December, 1923.

BOOKS EXAMINED FOR PLACE NAMES BY 31ST DECEMBER, 1923.

Amity, Memories of	Thomas Welsby
Bellenden-Ker, Report of Government Expedition to	A. Meston
Bowen Book, The	W. J. Doherty, 1920
Bundaberg, History of	J. Y. Walker, 1890
Centre of Queensland, Journal of Exploration in	J. McKinlay
Cooksland	J. D. Lang
Early Days, In the	J. J. Knight
Expeditions for the Relief of Burke and Wills	McKinlay, W. Landsborough, Walker, Norman, and Howitt
Experiences	Mrs. T. Holder Cowl
Facing Island, Report of Wreck on	
Gladstone Colony, The	J. M. Hogan
Journal, Fraser's	Charles Fraser
Journal of a Queensland Squatter, Pages from the	Oscar de Satge, 1901
Maranoa District, Reminiscences of Early Settlement of	Mrs. M. A. McManus
Maryborough, Reminiscences of	George Loyau
Mount Abundance or the Experience of a Pioneer Squatter in Australia 30 years ago	Alan Macpherson

New South Wales, History of	J. D. Lang
North Coast Expedition, 1873, Reports and Narrative of the	G. Elphinstone Dalrymple
Northernmost Australia, Vols. I. and II. ..	R. Logan Jack
North Queensland, Early Days of	Edward Palmer
North Queensland, Forty-five Years' Experience in	W. R. O. Hill
North Queensland, Reminiscences of India and, 1857-1912	Robert Gray
North-West Queensland Aborigines, Ethnological Studies Among	Walter E. Roth, 1897
Northern Seas, In	Alf. Searcy (E. Whittington)
Opals and Agates	Nehemiah N. Bartley, 1892
Pioneering Days: Early Sixties	G. Sutherland
Port Mackay, Queensland Discovery and Settlement of	H. Ling Roth, 1898
Queensland, Early Settlement of	John Campbell
Queensland, Genesis of	H. S. Russell
Queensland, History of Colony, Part I. ..	William Coote
Reminiscences	E. Campbell
Reminiscences	John Watts
Reports, 1872 and 1878	Hann and Jack
Rockhampton Fifty Years Ago	J. H. Macartney
Rockhampton, The Early History of ..	G. T. S. Bird
Surveying Voyage of H.M.S. "Fly," Narrative of	J. B. Jukes, 1847
Terra Australis, Voyage to	Matthew Flinders
Townsville Book, The	W. J. Doherty, 1920
Voyages	Captain Cook

PROVINCIAL BRANCHES.

Bundaberg Branch.—Chairman: Ald. W. S. P. Gavigan; Hon. Sec: Mr. D. A. O'Brien.

Gympie Branch.—Chairman: Ald. J. L. Thomas; Hon. Sec: Mr. J. E. O'Regan.

Ipswich Branch.—Chairman: Mr. R. H. Johnston; Hon. Sec.: Mr. P. W. Cameron.

Mackay Branch.—Chairman: Ald. A. F. Williams; Hon. Sec.: Mr. F. H. Perkins.

Maryborough Branch.—Chairman: Ald. H. A. Reed; Hon. Sec.: Mr. W. H. Lock.

Toowoomba Branch.—Chairman: Dr. T. A. Price; Hon. Sec.: Mr. C. G. Warrian.

Warwick Branch.—Chairman: Mr. James De Conlay; Hon. Sec.: Rev A. T. Watson.

THE THOMSON FOUNDATION GOLD MEDAL.

Awards.

The Thomson Foundation Gold Medal of the Royal Geographical Society of Australasia (Queensland), established in 1900 in honour of Dr. J. P. Thomson, the Founder of the Society, shall be awarded annually, or at such other times as the Council may approve, to the author of the best original contribution to Geographical Literature, provided it be of sufficient merit, approved and accepted by the Council. Special awards of the Medal may also be made from time to time to such persons as have gratuitously rendered eminent services to the Society.

The following are the names of the recipients of the Medal, the grounds of the award being noted only briefly here, but are given more fully in the "Journal," to which reference is hereafter made:—

1901—**Dr. J. P. Thomson,** for his great services to Geographical Science. *Vide* "Queensland Geographical Journal," vol. xv., pp. 133-134; vol. xvi., pp. 132-135, 141-142.

1906—**Sir Hugh M. Nelson,** for his valuable services to the Society. *Vide* "Queensland Geographical Journal," vol. xxi., p. 151.

1910—**Sir Arthur Morgan,** for valuable services rendered to the Society. *Vide* "Queensland Geographical Journal," vol. xxv., p. 144.

1917—**Dr. T. Griffith Taylor,** for "Thesis on the Settlement of Tropical Australia." *Vide* "Queensland Geographical Journal," vol. xxxii-xxxiii., p. 1.

1902—**Major Sir Hamilton J. Goold-Adams,** for valuable services to the Society as President. *Vide* "Queensland Geographical Journal," vol. xxxiv-xxxv., p. 69.

1921—**Hon. W. F. Taylor, M.D.,** for valuable services to the Society. *Vide* "Queensland Geographical Journal," vol. xxxvi-xxxvii., p. 99.

DIPLOMAS OF FELLOWSHIP.

The following gentlemen have been awarded the Diploma of Fellowship under Section IV. of Clause 3, Constitution and Rules (*see page 2 of cover*):—

H.R.H. the Prince of Wales, K.G., &c.

*Major Sir Hamilton J. Goold-Adams, G.C.M.G., C.B., F.R.G.S.

Clifford H. Hay, Esq., C.M.G., M.V.O., Secretary, Premier's Department, Sydney, N.S.W.

Professor J. W. Gregory, D.Sc., F.R.S., Geological Department, University, Glasgow, Scotland.

*The Right Hon. Sir S. W. Griffith, G.C.M.G., M.A., &c.

The Right Hon. Lord Lamington, G.C.M.G., G.C.I.E., B.A., F.R.G.S., Hon. F.R.S.G.S., &c.

*The Right Hon. Sir William MacGregor, G.C.M.G., C.B., M.D., LL.D., D.Sc., Hon. F.R.S.G.S., &c.

The Right Hon. Viscount Novar of Raith, G.C.M.G., LL.D.

*J. R. Atkinson, Esq., L.S., J.P.
E. C. Barton, Esq., C.E.
*Charles Battersby, Esq., J.P.
*Harry Baynes, Esq., J.P.
Major A. J. Boyd
Hon. F. T. Brentnall
*John Cameron, Esq., J.P.
J. C. Cartledge, Esq.
*R. M. Collins, Esq., J.P.
Alexr. Corrie, Esq., J.P.
*Ald. John Crase, J.P.
B. Dunstan, Esq.
E. E. Edwards, Esq., B.A.
J. T. Embley, Esq., L.S.
F. B. C. Ford, Esq., J.P.
*Robert Fraser, Esq., J.P.
L. C. Horton, Esq., J.P.
A. S. Kennedy, Esq.
*W. A. Dudley Le Souëf, Esq., C.M.Z.S., &c.
C. B. Lethem, Esq., C.E.
W. M. L'Estrange, Esq.
Hon. C. F. Marks, M.D.
R. H. Matthews, Esq., L.S., J.P., &c.
Thos. J. McMahon, Esq.
Rev. E. N. Merrington, M.A., Ph.D.
H. W. Mobsby, Esq., F.R.S.A.
*Hon. Sir Arthur Morgan, Kt., F.R.G.S., &c.
Alexander Muir, Esq., J.P.
His Excellency Hon. J. H. P. Murray, C.M.G.
*George Phillips, Esq., C.E.
L. F. Schoenheimer, Esq., J.P.
J. A. Sorell, Esq.
A. A. Spowers, Esq., J.P., &c.
*James Stodart, Esq., M.L.A.
*T. S. Sword, Esq., J.P.
Hon. W. F. Taylor, M.D.
Capt. W. C. Thomson
A. D. Walsh, Esq., J.P.
*E. M. Waraker, Esq., J.P.
J. P. Wilson, Esq.
W. A. Wilson, Esq.
Rev. L. L. Wirt, B.D.

* Dead.

LIST OF MEMBERS.

(P) Members who have contributed papers which are published in the Society's "Journal." The numerals indicate the number of such contributions.

(PP) Past President.

A dagger (†) prefixed to a name indicates a member of the Council.

Life members are distinguished thus (*).

Should any error or omission be found in this list, it is requested that notice thereof be given to the Hon. Secretary.

Foundation Members.

P1 Allardyce, His Excellency Sir Wm. L., K.C.M.G., Govt. House, St. Johns, Newfoundland.
Alton, R., Brisbane.
Armour, R. L., J.P., Brisbane.
P1 Atkinson, J. R., L.S., Ipswich.

Bailey, T. S., Survey Department, Brisbane.
P1 Bartley, N., Brisbane.
Bell, W., Supreme Court, Brisbane.
P1 Bennett, E. J., Survey Department, Brisbane.
Brydon, J. M., J.P., Brisbane.

Coghlan, J., Mount Eagle, Cooyar.

Daniell, E. N., Survey Department, Brisbane.
Davidson, W. M., Deputy Surveyor-General, Brisbane.
Drury, E. R., C.M.G., General Manager, Q.N. Bank, Brisbane.

Ferguson, J., J.P., Brisbane.
Foxton, Hon. J. F. G., Brisbane.
Fraser, T., L.S., Brisbane.

Gailey, R., J.P., Brisbane.
P9 PP Gregory, Hon. Sir A. C., K.C.M.G., M.L.C., F.R.G.S., &c., Brisbane.

Heath, G. P., J.P., Comm. R.N., Brisbane.
Heeney, F. X., J.P., Lands Department, Brisbane.
P1 Hennessy, Capt. J. M., New Guinea.
Hoggan, R., B.A., Survey Department, Brisbane.
P1 Hull, A. A., L.S., Survey Department, Brisbane.

Langford, W. H., Survey Department, Brisbane.
Lavarack, Major C. W., Survey Department, Brisbane.
P1 Leonard, G. A., L.S., Yorick Club, Collins Street, Melbourne.
Lilley, Hon. Sir Charles, Kt., Chief Justice, Brisbane.
Lloyd, W. M., J.P., Brisbane.
Luck, H. C., F.R.G.S., J.P., Commercial Travellers' Club, Elizabeth Street, Brisbane.

LIST OF MEMBERS—*continued.*

Macpherson, Hon. P., M.L.C., Brisbane.
Marks, Hon. C. F., M.D., M.L.C., FELLOW, Wickham Terrace, Brisbane.
McDonald, G. T., L.S., Rocklea.
McDonnell, E., J.P., Brisbane.
McDonnell, J., J.P., Brisbane.
McMaster, J., M.L.A., Brisbane.
Mein, His Honour Mr. Justice C. S., M.A., Brisbane.
P2 PP Miskin, W. H., Brisbane.
P1*Moore, T. B., F.R.S., Tas., New Norfolk, Tasmania.
Morehead, Hon. B. D., M.L.A., Brisbane.
P1†Muir, A., J.P., FELLOW, "Menzies," Brisbane.
Muir, J., J.P., Brisbane.

O'Connor, T., L.S., "Duporth," Oxley, Brisbane.

Persse, T. K., Survey Department, Brisbane.

Raff, H., L.S., Brisbane.
P1 Romilly, Hon. H. H., Port Moresby, New Guinea.
Russell, H. H. A., Immigration Department, Brisbane.
Ryan, R. A., J.P., Brisbane.

Stanley, F. D. G., F.R.S.B.A., Brisbane.
P1 PP Stodart, J., FELLOW, Market Street, Brisbane.

Thomson, John, M.B., &c., Brisbane.
P41 PP*Thomson, J. P., C.B.E., LL.D., Hon. F.R.S.G.S., &c., Hon. Sec. and Treasurer, Brisbane.
Trower, H., Survey Department, Brisbane.
Tully, W. A., B.A., F.R.G.S., Surveyor-General, Brisbane.

Viner, A. J., Brisbane.

P1 PP Waugh, J. N., M.D., Brisbane.
Williams, W., J.P., Brisbane.
Wilson, R. W., J.P., Brisbane.
Wilson, W. H., Brisbane.
P1 Woolnough, Rev. G., M.A., Brisbane.
Wright, H. T., Comm. R.N., Brisbane.

Members.

Adair, J. H., Fort Street, Maryborough.
Adam, C. H., Messrs. W. Adam & Sons, Maryborough.
Affleck, Thos. H., "Westhall," Freestone, Warwick, Q.
Alexander, Arthur S., Messrs. Alexander & Walker, Maryborough.
Allan and Sons, Messrs. Samuel, Manager, Albert Street, Brisbane.
Allan, David Muir, Engineering Supply Co., Ltd., Edward Street, Brisbane.
Allan, Dr. R. M., M.C., Wickham Terrace, Brisbane.
Allom, C. V., c/o B.P. and Co., Sourabaya, Java.
Allom, S. R. F., F.F.I.A., F.C.P.A., 268 Edward Street, Brisbane.
Amiet, W. A., M.A., Barrister, Sydney Street, Mackay.
Anderson, His Worship Alderman J., Warwick.

LIST OF MEMBERS—*continued.*

Andonara, A. T., Leopard Street, Kangaroo Point, Brisbane.
Appel, Hon. J. G., M.L.A., "Sea Glint," Elston, Southport, Q.
Archibald, J. E., Queen Street, Maryborough.
Armati, P. E., Sydney Street, Mackay.
Aroney, Peter, 470 George Street, Brisbane.
Ash, Rev. F. L., Albert Street Rectory, Mackay.
Ashton, E. S., Messrs. Stuparts Ltd., Maryborough.
*Austen, L., Daru, W. D., Papua.
Austin, Rev. A. H., M.A., Ipswich.
Avenell, Ald. A. E., Stationer, Bourbong Street, Bundaberg.

Bain, J., Exhibition Grounds, Bowen Hills, Brisbane.
Barbour, G. P., M.A., Principal Grammar School, Toowoomba.
Bardsley, G. H., "Hughenden," Logan Road, Coorparoo, Brisbane.
Bardwell, J. H., "Tranend," Cracknell Road, Annerley.
Barker, B. J., High School, Mackay.
Barker, Miss E. J., B.A., Girls' Central School, Maryborough, Q.
Barker, T. J., "Queensland Times" Office, Ipswich.
Barlow, Dr. J. Marion, Margaret Street, Toowoomba.
Barnes, G. P., M.L.A., Palmerin Street, Warwick.
Barnes, J. H. S., Canning Downs, Warwick.
Barnes, Hon. W. H., M.L.A., J.P., Milsom Street, Coorparoo, Brisbane.
*Barrett, Mrs. Walter, Eagle Junction, Brisbane.
*Beattie, Miss E. J., Girls' State School, Warwick.
Beckenham, C. H., Aust. Bank of Commerce, Mackay.
Beebe, J., Works Department, Brisbane.
Behan, Thos., Garfield Station, Jericho, Queensland.
Beirne, Hon. T. C., Brunswick Street, Valley, Brisbane.
Bell, E. T., M.L.A., Coochin Coochin, Queensland.
Bell, L. C., The Armidale School, Armidale, N.S.W.
Bell, V. D., Coochin Coochin, Queensland.
Berry, J. W., Nicholas Street, Ipswich.
Bertram, Hon. W., M.L.A., Speaker, Parliament House, Brisbane.
Betty, C. H., Margaret Street, Toowoomba.
Biggs, J. E., Perkins and Co., Mary Street, Brisbane.
Black, Archie L., Victoria Street, Mackay.
Black, Fred, senr., Alfred Street, Mackay.
Black, J. D., 66-68 Queen Street, Brisbane.
Blackman, A. H. ————
Booker, C. J., "Lumeah," Graceville.
Booth, O. I., Messrs. Gobbett and Booth, Ruthven Street, Toowoomba.
Borcham, Col. J. F., "Gandor," Maryborough Road, Bundaberg.
Borton, Mark W., Toowoomba, Queensland.
Bott, Miss Nan E., "Walmer," Brunswick Street, New Farm, Brisbane.
Bottomley, Jas. Parker, Ipswich.
Bourne, Fred., Victoria Street, Mackay.
Boyce, Mrs. Gerard, "Fernside," Toowoomba.
P2 Boyd, Major A. J., FELLOW, Hon. Auditor, Department of Agriculture and Stock, Brisbane.

List of Members—*continued.*

Brady, Miss Rene, Bundaberg.
Brennan, E. J., Solicitor, Palmerin Street, Warwick.
P4 PP†Brentnall, Hon. F. T., Fellow, "Eastleigh," Coorparoo, Brisbane.
Bridgman, G. F., Margaret Street West, Toowoomba.
Briggs, W. W. V., M.A., Scots College, Warwick.
Brown, H. E., Ruthven Street, Toowoomba.
Brown, Miss A. Douglas, "Oakdale," Brisbane Street, Ipswich.
Brown, Miss M., B.A., Principal, Church of England Girls' School, Warwick.
Brown, E. S., "Dawnie," Range, Toowoomba.
Brown, Mrs. E. S., "Dawnie," Range, Toowoomba.
Brown, Dr. E. E., Brisbane Street, Ipswich.
Brown, J. Leonard, J.P., "Woggonora," Cunnamulla, Q.
Bryan, W. H., M.C., M.Sc., Queensland University, Brisbane.
Bull, Arthur, ————
Burbidge, W. E., Assayer, Gympie.
Burstow, Alderman T. S., Box 16, G.P.O., Toowoomba.
Buss, G. A., Planter, Bourbong Street, Bundaberg.
Buss, G. L., Managing Director, Messrs. Buss and Turner, Ltd., Bundaberg.
Butler, John Henry, Messrs. Butler Bros., Charlotte Street, Brisbane.
Byrne, Rt. Rev. Monsignor, V.G., P.P., St. Mary's, Ipswich, Q.

Calvert, Thomas, J.P., Box 67, Proserpine, Q.
Cameron, Colin, Foundry, Victoria Street, Mackay.
Cameron, Dr. J. A., B.A., M.B., East Street, Ipswich.
*Cameron, Pearson Welsby, J.P., Hon. Local Secretary, Nicholas Street, Ipswich, Q.
*Campbell, A., J.P., Glengyle Station, Birdsville, Queensland.
Campbell, G. P., Messrs. Jas. Campbell and Sons, Ltd., Creek Street, Brisbane.
Campbell, Rev. R. S., The Rectory, Albert Street, Mackay
Campbell, Victor F. J., Messrs. Jas. Campbell and Sons, Ltd., Creek Street, Brisbane.
Cannon, D., "Como," Yeronga, near Brisbane.
Canter, Joe, Palmerin Street, Warwick.
Carey, J., Rankin and Carey, Merchant, Gympie.
Cartledge, John Colenso, Fellow, 246 Umbila Road, Durban, Natal, S. Africa.
Chauvel, P. B., Kent Street, Maryborough.
Chenoweth, Dr. Ern., District Hospital, Mackay.
Christsen, H. T., Merchant, Bourbong Street, Bundaberg.
Clark, Robert, Central Mill, Pleystowe, Mackay.
Clay, W., Esq., Manager, Electric Light Coy., Bundaberg.
Cobden, Richard, Brisbane Club Chambers, Adelaide Street, Brisbane.
*Collins, Mrs. R. M., "Tamrookum," Beaudesert, Queensland.
Colman, G. S., Q.M.E. Co., Mary Street, Brisbane.
Colwell, Rev. James, F.R. Hist. S., 754 Darling Street, Rozelle, Sydney, N.S.W.
*Comino, T. S., Upper Kennedy Terrace, Paddington, Brisbane.

LIST OF MEMBERS—*continued.*

Connolly, Dr. T. P., Russell Street, Toowoomba.
Conlay, James De, Local Chairman, Dragon Street, Warwick.
Corlass, E. J., "Wyuna," Ormond Street, Ascot, Brisbane.
Cornwell, E. M., Victoria Street (Red Arcade), Mackay.
*Corrie, Alex., J.P., FELLOW, Parbury House, Eagle Street, Brisbane.
Corser, E. S., Messrs. Corser and Coy., Ltd., Maryborough.
Cosh, Rev. James, B.D., Old Sandgate Road, Wooloowin, Brisbane.
Costello, Major E., M.L.A., Parliament House, Brisbane.
Costin, T. J. F., Ph.C., M.P.S., Mewing's Block, Ipswich Road, South Brisbane.
Coutts, J. V. D., Union Bank Chambers, Brisbane.
Coyne, The Hon. J. H., Land Court, Brisbane.
Cramond, D., Ruthven Street, Toowoomba.
Cranley, J. P., Produce Merchant, Turbot Street, Brisbane.
Cribb, H. S., Messrs. Cribb & Foote, Ipswich.
Croker, James, Barry House, Victoria Street, Mackay.
*Crorkan, T., J.P., ————
Crowther, A. J., General Manager, Railway Department, Townsville.
Crowther, S., J.P., Brighton Road, South Brisbane.
Crunkhorn, W. H., Nebo Road, Mackay.
Cullen, Mrs. M., Guy Street, Warwick.
Cullinane, J. A., General Merchant, Gympie.
P1 Cumbrae-Stewart, F. W. S., D.C.L., B.A., The University of Queensland, Brisbane.
Cumming, A. J., Government Printer, Brisbane.
P1 Cummins, J. J., Authorised Surveyor, c/o Survey Office, Brisbane.
Curr, C. M., "Ruwenzori," Rosehill, Warwick, Q.
Curr, F. C., Oxley Street, Corinda, Q.
Curran, Mrs. Margaret, Wallace Street, Newtown, Toowoomba.
Currie, James, Palace Hotel, Bundaberg.

Davenay, M. B., Palmerin Street, Warwick.
Davie, Charles, Anvil Stores, River Street, Mackay.
Davies, The Rev. Canon Alfred, St. James's, Toowoomba.
Delaney, W. G., Solicitor, Nicholas Street, Ipswich.
Dent, Dr. R. C., Palmerin Street, Warwick.
Doggett, Ald. Harry, J.P., 35 Arthur Street, Fortitude Valley, Brisbane.
Douglas, A. S., Scots College, Warwick.
Donnan, Robt. L., Albert Street, Mackay.
Down, Alderman G., J.P., Ward's Chambers, Queen Street, Brisbane.
Dowrie, Messrs. G. and J., Engineers, Merivale Street, South Brisbane.
Drake, E. T., "Herald" Office, Goondiwindi, Queensland.
Drewe, A. W., Q.M.E. Co., Mary Street, Brisbane.
Drill, R., Alfred Street, Mackay.
Duhig, Dr. J. V., Wickham Terrace, Brisbane.
†Duhig, His Grace the Most Rev. Archbishop, D.D., Vice-President, "Dara," Brisbane.
Dunn, Miss May, cr. Bourbong and Branyan Streets, Bundaberg.

LIST OF MEMBERS—*continued.*

Dunn, W. H. A., "Toowoomba Chronicle," Toowoomba.
P2 Dunstan, Benjamin, F.G.S., FELLOW, Chief Govt. Geologist, Brisbane.
Dunstan, T., M.L.A., Gympie.

Eaves, W. B., Accountant, Targo Street, Bundaberg.
Eden, Mrs. D. R., Box 123, P.O., Stanthorpe, Q.
Edgerton, Dr. E. C., Grosvenor House, Bundaberg.
P1 Edwards, Edward E., B.A., FELLOW, Telegraph Building, Brisbane.
Effey, William, J.P., Central Buildings, Edward Street, Brisbane.
Egan, Dr. John, M.B., Palmerin Street, Warwick.
Eizenberg, H., Palmerin Street, Warwick.
Ekelund, T., Daly Street, Manly, Queensland.
Elliot, Eric, Messrs. Elliott Bros., Eagle Street, Brisbane.
Ellison, T. A., Surveyor, Widgee Shire Hall, Gympie.
Evans, Mrs. J. G., "Brokley," Hampstead Road, South Brisbane.
Fahey, J. T., care of Railway Goods Office, Roma Street, Brisbane.
Fairfax, J. Hubert, J.P., "Marinya," Cambooya, Q.
Fairlie, James, Messrs. Fairlie and Sons, Maryborough.
Falkner, Dr. E. A., Margaret Street, Toowoomba.
Farrar, Mrs. J., Albion Street, Warwick.
Ferguson, J. A., B.A., LL.B., 167 Phillip Street, Sydney, N.S.W.
Fish, George, J.P., 46 Grey Street, South Brisbane.
Finemore, D. S. M., Dentist, Woongarra Street, Bundaberg.
FitzGerald, C. A., c/o City Electric Light Co., Boundary Street, Brisbane.
Fleming, M. T., Solicitor, Palmerin Street, Warwick.
*Foot, J. A., J.P., "Warrinilla," Rolleston, Queensland.
P1†Ford, F. B. Campbell, FELLOW, Deputy Surveyor-General, Brisbane.
Ford, R. B., Bowen Hills, Brisbane.
Forster, His Excellency Rt. Hon. Lord, G.C.M.G., Patron, Federal Government House, Melbourne, Victoria.
Forsyth, James, "Braelands," South Toowong, Brisbane.
Foster, A. T., Norman Crescent, Norman Park, East Brisbane.
Fox, C. B., Messrs. Nicol Robinson, Fox, and Edwards, Solicitors, Queen Street, Brisbane.
Frankel, Philip, J.P., "Zonoma," Mark Street, New Farm, Brisbane.
Fraser, J. A., C.E., Main Roads Board, Brisbane.
Fraser, Captain C. Sankey, Edward Street, Brisbane.
Fraser, Dr. W. A., M.B., B.S., Boonah.
Freeleagus, C., Consul for Greece, Freeleagus Chambers, Edward Street, Brisbane.
Frith, Mrs. J. O., "Rodway," Range, Toowoomba.

Gallagher, Dr. M. J., Albert Street, Mackay.
Gallagher, Mrs., Albert Street, Mackay.
Galletly, A. M. M., Alfred Street, East Mackay.
Garde, Dr. Lee, John Street, Maryborough.
Garland, S., Wholesale and Retail Merchant, Kent Street, Maryborough.
Garland, The Rev. Canon D. J., Ithaca, Brisbane.
Garrick, T. A., Manager Olympia Pictures, Bundaberg.

LIST OF MEMBERS—*continued.*

Gataker, M. L., Messrs. Gataker and Sons, Maryborough.
Gavegan, His Worship Alderman W. S. P., Local Chairman, Bundaberg.
*Gibson, D. W., Authorised Surveyor, c/o Survey Office, Brisbane.
Gibson, Mrs. W. G., Bingera, Bundaberg.
Gibson, W. G., Bingera, Bundaberg.
Gielis, Walter, Australian Steamships, Mackay.
Gilchrist, E. F., B.A., M.C.E., City Engineer, Brisbane.
Gillies, R. G., J.P., City Printing Works, Elizabeth Street, Brisbane.
Girdis, John, Canberra Café, Queen Street, Brisbane.
Glissan, A. H., "Taabinga," Jellicoe Street, Toowoomba.
Glissan, C. E., "Taabinga," Jellicoe Street, Toowoomba.
P1†Goddard, Professor E. J., Queensland University, Brisbane.
Godsall, His Worship Alderman A. R., Ruthven Street, Toowoomba.
Godsall, Mrs. A. R., The Mayoress, Ruthven Street, Toowoomba.
Goodman, George, Alfred Street, Charleville, Q.
Gordon, C. G., North Street, Maryborough.
Gorringe, J. A., Authorised Surveyor, Kempton, Tasmania.
Graham, Mrs. Thos., Victoria Downs, *via* Katherine, Northern Territory.
Graham, Wm. E., Campbell Street East, Toowoomba.
Greene, Miss Alice J. Alison, Principal, Moreton Bay Girls' High School, Wynnum.
Greenaway, Mrs., Wantley Street, Warwick.
Greenham, Dr. Eleanor Constance, Edward Street, Brisbane.
Greensill, E. H. R., C.E., Authorised Surveyor, Box 719 G.P.O., Brisbane.
Grey, Mrs. J. R., F.L.S., Apuu, Moorea Island, *via* Papeete, Tahiti.
Griffin, William Charles, J.P., Somerset Farm, Gordon Vale, near Cairns, Q.
Griffith, Alderman A. A., Curzon Street, Toowoomba.
Griffith, S., Union Bank Manager, Gympie.
Griffiths, F. A., York Street, Ipswich.
P1 Groom, Hon. Sir L. E., K.C.M.G., M.A., LL.M., M.P., "Unara," Albert Street, Toowoomba.
Groom and Sons, W. H., Margaret Street, Toowoomba.
Gruter, O. J., Dentist, Barolin Street, Bundaberg.
Gunn, Donald, "Boolarwell," Talwood, Q.

Hale, E. S., Merchant, Maryborough Road, Bundaberg.
Hall, J. S., F.A.I.S., Goondiwindi, Queensland.
Hall, T. R., Architect, Kodak Building, Queen Street, Brisbane.
Hall, Thomas, Annerley Road, South Brisbane.
Hall, Thos., East Warwick.
Hamilton, R. C., B.A., Principal, Technical College, Warwick.
Hanger, T., Principal High School, Gympie.
Hannaford, S., J.P., "Utopia," Stanthorpe, Queensland.
Hansen, W. H., care of Hansen and Dubois, Victoria Street, Mackay.
Harbord, H. H., J.P., Maytown, Queensland.

LIST OF MEMBERS—*continued.*

Harding, G. Y., Licensed Victuallers' Association, Kent Street, Maryborough.
Hart, Dr. B. L., East Street, Ipswich.
*Hart, J. H., "Culterfel," Manly, Queensland.
Hart, F. H., Messrs. Gibbs, Bright, and Co., Eagle Street, Brisbane.
Harwood, S. J., North School, Taylor Street, Toowoomba.
Haviland, C. V., Govt. Land Buyer, Port Moresby, Papua.
Hayes, The Rev. Leo, Kilcoy.
Heiner, H. H., B.A., Solicitor, Town Hall, Ipswich.
Henderson, A. A., President Chamber of Commerce, Lawrence Street, Gympie.
Henderson, G., J.P., "Elmbank," Laidlaw Parade, East Brisbane.
Herbert, J. A., Authorised Surveyor, Stuart Street, Toowoomba.
Herbertson, Frank, Cane Planter, Windermere, Bundaberg.
†Hertzberg, A., Messrs. A. M. Hertzberg and Co., Charlotte Street, Brisbane.
Hertzberg, Marcus, B.A., LL.B., Messrs. A. M. Hertzberg and Co., Charlotte Street, Brisbane.
Hetherington, Alderman J. W., J.P., Main Street, Kangaroo Point, Brisbane.
Hill, J. V., Town Clerk, Goondiwindi, Queensland.
Hill, L. C., Authorised Surveyor, Shire Street, Coorparoo.
*Hill, Mrs. Lumley, Belle Vue House, Bellevue, Q.
Hillcoat, Reginald E. R., J.P., "Teneriffe House," Teneriffe, Brisbane.
Hillman, J., Victoria Street, Mackay.
Hindell, J. J., "Brooyar House," Court Street, Ipswich.
*Hodel, F. C., J.P., Cairns, Queensland.
Hodges, A. G., Head Teacher, East End State School, Bundaberg.
Hogarth, R. C., "Clio," Taylor Street, Toowoomba.
*Holt, W. H., F.R.C.I., "Glanwyne," Manly Point, Manly, N.S.W.
Horn, Dr. Alex., "Ravenscourt," Herries Street, Toowoomba.
Horn, Dr. David, B.A., M.B., Ch.B., Ruthven Street, Toowoomba.
Horsburgh, Andrew M., General Merchant, Maryborough.
P1*Horton, Leonard Cecil, J.P., FELLOW, "The Gunyah," Johnstone River, Q.
Hughes, C. H., Chemist, Maryborough.
Humphreys, T. C., Surveyor, Perry Street, Bundaberg.
Hunter, R. D., Boys' State School, Warwick.
†Huxham, The Hon. J., M.L.A. (Vice-President), Department of Public Instruction, Brisbane.
*Hyne, H. J., Maryborough, Queensland.

Illingworth, W. E., Messrs. A. M. Hertzberg and Co., Charlotte Street, Brisbane.
Innis, Mrs. A., "The Ochils," Sarina, North Coast Line.
Irving, J. Washington, M.R.C.V.S.L., Ann Street, Brisbane.
Irving, W. Edmund, "Lorina," Kirkland Avenue, Coorparoo, Brisbane.
Irwin, Wm., "Daily News" Office, Warwick.

List of Members—*continued.*

Jackson, Thos. D., "Creagh," Chermside Street, Teneriffe, Brisbane.
James, W., Q. N. Bank, Wood Street, Mackay.
Jenkyn, The Rev. Canon T. L. H., B.A., St. Andrew's, South Brisbane.
P2 Jensen, Dr. H. I., Treasury Chambers, George Street, Brisbane.
Jensen, Thor. H., Authorised Surveyor, Treasury Chambers, George Street, Brisbane.
Johnston, Robert Henderson, F.V.C.M., F.I.G.C.M., Local Chairman, Nicholas Street, Ipswich, Q.
P1 Johnston, Professor T. Harvey, M.A., D.Sc., University, Adelaide.
Johnston, The Rev. W. J., B.A., James Street, Toowoomba.
Jones, Arthur, senr., J.P., Bondoola, *via* Rockhampton, Queensland.
Jones, Hon. T. L., Messrs. Foggit and Jones, Turbot Street, Brisbane.
Jordan, Rev. Father M., Presbytery, Nundah, Q.
Joyce, J., Helidon Spa Water Co., Skew Street, Brisbane.
Joyce, R., 228 Elizabeth Street, Brisbane.
Jubb, E. St. V., Ruthven Street, Toowoomba.
Just, John Stephens, City Electric Light Co., Boundary Street, Brisbane.

Kemp, Charles, "Hadleigh," Indooroopilly.
Kempster, Leonard, Farrington Hill, Alderley, Brisbane.
*Kennedy, A., Chesley Street, Auchenflower, Brisbane.
Kennedy, A. S., Fellow, Kingsholme, Fortitude Valley, Brisbane.
Kerr, R. A., M.A., B.Sc., Principal, Boys' Grammar School, Ipswich.
Key, W. F. S., Home Secretary's Office, Brisbane.
Kidd, Rev. Walter, Gregory Street, Mackay.
Kingsford, F. J., Town Clerk, Warwick.
Kirkaldy, John, J.P., Lorraine, Cloncurry, N.Q.
Kirke, The Rev. G. K., St. Stephen's Church, Ipswich.
Kirkland, T., Yangan, *via* Warwick.
Krone, B. H., Principal High School, Bundaberg.

Lade, F. W. H., 29 Sachville Street, Kew., Victoria.
Lamberton, H. F., care of W. H. Pantons Ltd., Mackay.
Lane, John, Principal, Rangeville School, Toowoomba.
Lather, John, Wantley Street, Warwick.
Lather, Miss J. E. L., Girls' State School, Mackay.
Lawrance, Miss G. C., B.A., Principal, Glennie School, Toowoomba.
Leahy, Hon. P. J., 293 Queen Street, Brisbane.
Lenox-Conyngham, Sir Gerald P., Kt, M.A., F.R.S., Trinity College, Cambridge, England.
Leonard, T. J., Victoria Street, Mackay.
L'Estrange, W. M., M.I.E.E., Fellow, G.P.O. Box 546, Brisbane.
*Lewis, A. A., J.P., ————
Lock, Wm. H., Hon. Local Sec., Kent Street, Maryborough.
Londy Bros., Messrs., Brisbane Street, Ipswich.
Long, H., Bundaberg.
Longman, H. A., Director, The Museum, Brisbane.
Loose, The Rev. Thomas, Sunnybank, Brisbane.
Loughran, E.

LIST OF MEMBERS—*continued.*

Love, G. A., Herbert Villa, Sandgate Road, Albion.
Lundager, Miss M. C., Girls' State School, Mackay.
Lyons, G. F., Auctioneer, Bourbong Street, Bundaberg.

Macansh, Roland, c/o Gas Co., Warwick.
Macdonald, Hamilton, and Co. (The Manager), Mary Street, Brisbane.
Macfarlane, Mrs. C. A., "Nyota," Lawnton, Queensland.
Macintosh, Hugh, Hon. Librarian, Dornoch Terrace, South Brisbane.
Macintosh, T. B., J.P., Dornoch Terrace, South Brisbane.
Mackness, Miss C., B.A., Principal, Presbyterian Girls' College, Warwick.
Macleod, J., J. Macleod and Son, Jewellers, Bourbong Street, Bundaberg.
Macrossan, H. D., B.A., Barrister, Lutwyche Chambers, Adelaide Street, Brisbane.
Manchester, E. J. T., M.E., &c., President Metropolitan Water and Sewerage Board, Brisbane.
Manning, W. J., "Daily Mercury," Mackay.
Maromattes, John, "Helios" Café, Roma Street, Brisbane.
Marsh, His Worship Alderman E. G., Goondiwindi, Queensland.
Massey, The Rev. C. H., St. Mark's, Warwick.
Maunsell, Mrs. D., Palmerin Street, Warwick, Queensland.
Mayers, G. R., c/o Bank of Queensland, Melbourne, Victoria.
Maynard, L. H., George Street, Bundaberg.
McArthur, Robert, District Engineer's Office, Maryborough, Q.
McConachie, J., Deputy Postmaster-General, Brisbane.
McCracken, S., Royal Hotel, Bundaberg.
*McDonald-Terry, A. J., J.P., ————
McDonnell, Dr. Aeneas J., Margaret Street, Toowoomba.
McDonnell, Mrs. Aeneas J., Margaret Street, Toowoomba.
McGowan, Mrs. E., Palmerin Street, Warwick.
McGrath, W. J., "Truth" Building, Queen Street, Brisbane.
McGregor, W., Pring Street, Ipswich.
McIntyre, D., "Strathmore," Toombeah, Queensland.
McIver, Miss Nell, The University, Brisbane.
McKenzie, Dr. A. D., Russell Street, Toowoomba.
McKenzie, John A., Manager, Messrs. Robert Reid and Co., Limited, 144-146 Edward Street, Brisbane.
McKeon, J., Head Teacher, Central State School, Bundaberg.
McLean, R. W., Railway Street, Toowoomba.
McLelland, Dr. Hugh, Maryborough.
McLeod, Alex., J.P., Elizabeth Street, Brisbane.
McLeod, J. J. W., "Terranora," Windermere Road, Hamilton, Brisbane.
P1 McMahon, Thos. J., FELLOW, c/o V. Yabsley, Esq., Bank of Australasia, Martin Place, Sydney, N.S.W.
McWilliam, T. M., Mowbray Terrace, East Brisbane.
Menzies, A. R., D.D.S. (Penn.), L.D.S., R.C.S. (Edin.), L.D.S.Q., 63 Queen Street, Brisbane.
Mercer, T. T., Keogh Street, Ipswich.

List of Members—*continued.*

Merchant, E., Targo Street, Bundaberg.
†Merrington, Rev. E. N., M.A., Ph.D., Fellow, Dunedin, New Zealand.
Meyer, F. E., M.A., Principal Boys' Grammar School, Maryborough.
Micheli, J., Sandgate, Q.
Millward, W. A., Technical College, Warwick.
Minnis, J. C., Chemist, Brisbane Street, Ipswich.
Mobsby, H. W., F.R.S.A., Fellow, Hon. Lanternist, Department of Agriculture and Stock, William Street, Brisbane.
†Moffat, W., Manager, National Bank of Australasia, Queen Street, Brisbane.
Moore, Dr. J. I., Commissioner for Public Health, Brisbane (or Wynnum).
Moran, H. S. F., Dental Surgeon, A.M.P. Buildings, Brisbane.
Morgan, F. J., Wheat Board, Margaret Street, Toowoomba.
Morgan, Miss Edith M., Principal Girls' Grammar School, Maryborough.
Morgan, Dr. T. H., "Milford," Wickham Terrace, Brisbane.
Morris, Dr. L., Caledonian Hill, Gympie.
Morton, T., Morton and Morton, Solicitors, Maryborough, Q.
Moss, R. D., Messrs. Dalgety and Co., Elizabeth Street, Brisbane.
Mottershead, A., B.A., B.Sc., Church of England Grammar School, Brisbane.
Moxon, W. E., Adelaide S.S. Co., Queen Street, Brisbane.
Muir, Dr. R. A., Dental Surgeon, Edward Street, Brisbane.
Mullard, J., care of Wallis and Co., Wood Street, Mackay.
Mullins, James, c/o Mrs. Tinline, No. 1 Woodbine Avenue, Greenlane, Auckland, New Zealand.
*Munro, E., "Darloo," Albion, Brisbane.
Munro, Mrs., Sydney Street, Mackay.
Murphy, The Hon. Peter, Hamilton, Brisbane.
Murray, His Excellency Hon. J. H. P., C.M.G., Fellow, Lieut.-Governor, Port Moresby, Papua.

P3 Nathan, His Excellency Rt. Hon. Sir Matthew, G.C.M.G., F.R.G.S., President, Government House, Brisbane.
Needham, F. H., J.P., 37 Marlborough Street, Drummoyne, Sydney, N.S.W.
Nelson, D. J., Sinclair Street, Toowoomba.
Nelson, W. M., Tramway Office, 51 Countess Street, Brisbane.
Nielson, Hon. C. F., Messrs. Hamilton and Nielson, Solicitors, Bundaberg.
Nicholas, C. E., J.P., "Highlands," Samford, Queensland.
*Noble, H. G., "Linstarfield," Ascot, Brisbane.
Noonan, Jas. A., Palace Hotel, Sydney Street, Mackay.
Norris, H. L., Juliette Street, Mackay.
Nutting, Capt. Gerald, Station Street, Clayfield, Brisbane.

Oakeley, The Rev. Canon W. T., St. Luke's, Toowoomba.
O'Brien, D. A., Industrial Inspector, Gympie.
O'Hara, R. E., J.P., New Park, Ballynock, County Sligo, Ireland.

LIST OF MEMBERS—*continued.*

O'Regan, J. E., Local Hon. Sec., Mary Street, Gympie.
O'Reilly, Charles, J.P., Dornoch Terrace, South Brisbane.
O'Shea, W., Head Teacher, North Bundaberg State School, Bundaberg.

Page, George J., Chemist, Bourbong Street, Bundaberg.
Page, Guy M., Cintra Street, Ipswich.
Paine, A. A., J.P., "Illalong," Brandon, *via* Townsville, Queensland.
Parker, William Richard, L.D.S., Eng., Dentist, Edward Street Brisbane.
Parkinson, F. C., Elizabeth Street, Brisbane.
Parkinson, H., "Queensland Times" Office, Ipswich.
Paterson, Alderman F. J., Taylor Street, Toowoomba.
Paterson, Mrs. F. J., Taylor Street, Toowoomba.
Patterson, Dr. Mervyn, "Moringa," East Street, Ipswich.
Paull, S. P., Queensland Novelty Company, Elizabeth Street, Brisbane.
Payne, John C., Messrs. Payne and Payne, Solicitors, Bundaberg.
Peak, W. C., Arthur Street, Toowoomba.
Pearce, W. J., Land Agent, Gympie.
Peart, John, C.E., M.I. Mech. E. (Lon.), Engineer for Water Supply, Metropolitan Water and Sewerage Board, Brisbane.
Peinger, Miss, Mackay.
Pender, M. P., Solicitor, Brisbane Street, Ipswich.
Perkins, F. H., Local Hon. Sec., Boys' State School, Mackay.
Perkins, Mrs. F. H., Moore Street, Mackay.
Perrett, Arthur, J.P., "Kaboonga," Kinbombi, Q.
*Perry, G. H., J.P., c/o Messrs. Perry Brothers, Ltd., Elizabeth Street, Brisbane.
Phillips, Dr. G. G. O., Guy Street, Warwick.
Phipps, J. H., King Street, East Brisbane.
Piggott, O. A., 310 Edward Street, Brisbane.
*Plant, Col. C. F., F.R.A.S., J.P., "Ferndale," Ashgrove, near Brisbane.
Pollard, A. T., "Wellhouse," Ironside, Toowong, Brisbane.
Poole, Miss C., Gibb Street, Kelvin Grove, Brisbane.
Pope, The Rev. W. G., River Terrace, Auchenflower, Brisbane.
Porter, Wm. George, Wood Street, Mackay.
Pound, C. J., F.R.M.S., Yeerongpilly, Brisbane.
Powell, J. V., c/o E. Rich and Co., Goondiwindi, Queensland.
Price, Dr. T. A., Local Chairman, Russell Street, Toowoomba.
Purkiss, L. D. M., New Zealand Insurance Co., Brisbane.

Quaid, J. D., J.P., "Ahillon," River Bank, Hill End, South Brisbane, Queensland.

Ramsey, A. G., "Times" Newspaper Office, Gympie.
Rankin, R., Rankin and Carey, Merchants, Gympie.
Raymond, Ald. A. J., J.P., 178 River Terrace, Kangaroo Point, Brisbane.
Real, His Honour Mr. Ex-Justice, Coorparoo, Brisbane.
Redmond, W. J., P.O. Box 81, Warwick.
Reed, Dr. E. B., Barolin Street, Bundaberg.

LIST OF MEMBERS—*continued.*

Reed, His Worship Alderman H. A., Local Chairman, Maryborough.
Reid, F. R., Department of Agriculture and Stock, Brisbane.
Reid, P. E. A., J.P., Queensland National Bank, Ltd., Brisbane.
Rennie, Miss B. L., B.A., Glennie School, Toowoomba.
Rentoul, A. C., Daru, Papua.
P1†Richards, Professor H. C., D.Sc., University, Brisbane.
Roberts, A. E., Box 57, G.P.O., Ipswich.
Robertson, Henry, J.P., "Harelvyn," Abbott Street, New Farm, Brisbane.
Robertson, Brig.-General J. C., C.B., C.M.G., D.S.O., Taylor Street, Toowoomba.
Robertson, Dr. (Major) W. N., C.B.E., 69 Wickham Terrace, Brisbane.
Robinson, Sir T. B., G.B.E., K.C.M.G., 7 Cambridge Gate, Regent's Park, London, N.W.
Ross-Munro, W., Indooroopilly, near Brisbane.
Rowbotham, C., Grange Street, Toowoomba.
Rowland, J. D., East Warwick.
Rudd, William Henry, J.P., Messrs. Walter Reid and Co., Rockhampton, Q.
Russell, R., Jane Street, Manly, Queensland.
Ruthning, A. F. T., Solicitor, Lutwyche Chambers, Adelaide Street, Brisbane.
Ryan, Dr. J. P., Gympie.

Sanderson, Mrs. Eva E., Dentist, Bourbong street, Bundaberg.
Sandison, J. T., Victoria Pottery, Ipswich Road, South Brisbane.
Sargent, John, Melbourne Street, South Brisbane.
Saunders, G. J., M.Sc., B.E., Principal, Technical College, Ipswich.
Schmidt, Dr. Egmont, Barolin Street, Bundaberg.
Schooley, B. L., C.E., International Well Boring Co., Ann Street, Brisbane.
Scott, Dr. E. W. Kerr, Brunswick Street, Brisbane.
Scott, Mrs. E. J. Moncrieffe, "Wandowalla," Warwick.
Seabrook, George Kenilworth, J.P., F.R.C.I., Albert Street, Brisbane.
Serisier, W. J., P.O. Box 3, Goondiwindi.
Sexton, R. E., C.E. (Chief Engineer), Central Railway Offices, Brisbane.
Shackel, T. W., F.S.S., Thorn Street, Kangaroo Point, Brisbane.
Shannon, J., "Endrim," Sherwood Road, Toowong, Brisbane.
Shaw, Dr. Helen, ——
Sheldon, E. G., Surveyor, Gympie.
*Shepherd, Arthur, J.P., Milray Station, Pentland, N.Q.
Sinclair, D. G., Postmaster, Ipswich.
Sinclair, H. J., C. Engineer, Millaquin, Bundaberg.
Sinclair, R., Ruthven Street, Toowoomba.
Skyring, Z. D. S., Pie Creek, Gympie.
Slade, W. B., J.P., c/o A. E. Slade, "Glenbar," Glengallon Road, Warwick, Q.
Smith, E. Eldridge, care of Harbour Board, Mackay.
Smith, H. F., J.P., Queen and George Streets, Brisbane.

LIST OF MEMBERS—*continued.*

Smith, John, 93 Queen Street, Brisbane.
Smith, Dr. J. S., Guy Street, Warwick.
P1 Sorrell, John Arnold, FELLOW, Staff Surveyor, Rockleigh, Wagga Wagga, N.S.W.
Spathis, P., Brisbane Street, Ipswich.
Spence, Lockhart Horsburgh, J.P., Managing Director, E. Rich and Co., Brisbane.
Spencer, A. R., Dental Surgeon, 12 Queen Street, Brisbane.
Sperling, C. D., "Mayfair," Edward Street, Brisbane.
P1 PP Spowers, Allan A., FELLOW, Surveyor-General, Executive Building, Brisbane.
*Steele, E., Stainburn Downs, Aramac, Queensland.
Steele, J. D., J.P., Authorised Surveyor, Southport, Queensland.
Stephens, F. H., North Street, Maryborough.
Sterne, H., C.E., Rosenthal Shire Office, Warwick.
Stewart, E. D., Australian Bank of Commerce, Ipswich.
Stirling, A. C., C.E., District Engineer, Proserpine, Q.
Stone, J., Margaret Street, Toowoomba.
Stuart, W. J., Patterson Bros., Gympie.
Svensen, Captain O., "Norway," Galloway's Hill, Norman Park, Brisbane.
Sykes, F. B., Solicitor, Gympie.
Sym, Thos. H., General Agent and Auctioneer, Gympie.
Taylor, E., J.P., Messrs. Taylor and Colledge, Ltd., Wholesale Chemists, Charlotte Street, Brisbane.
Taylor, Miss M., Masseuse, care of Grosvenor House, Bundaberg.
Taylor, Capt. R. S., Assoc. I.N.A., Lloyd's Surveyor, Eagle Street, Brisbane.
Taylor, T. McI., Manager, Moreheads, Ltd., Brisbane.
†Taylor, Hon. W. F., M.D., FELLOW, &c., Vice-President, Preston House, Queen Street, Brisbane.
Theodore, Hon. E. G., M.L.A., Premier, Bowen Terrace, Brisbane.
The Bodleian Library (The Librarian), University of Oxford, England.
Thomas, His Worship Alderman J. L., Local Chairman, Gympie.
Thompson, Dr. Robert, "Bunya Bunya," Wickham Terrace, Brisbane.
P5 Thomson, Capt. W. C., FELLOW, "Loma Langi," Ascot, Brisbane.
Thynne, Col. Hon. A. J., Vice-Chancellor, Queensland University, Brisbane.
Thynne, Mrs. A. J., Highgate Hill, South Brisbane.
Tolmie, Hon. James, Margaret Street, Toowoomba.
Tristram, Eric, Hope Street, South Brisbane.
Tritton, F., George Street, Brisbane.
Trost, A. A., Kingshill Road, Ipswich.
Tryon, Henry, Government Entomologist and Vegetable Pathologist, Department of Agriculture and Stock, Brisbane.
Turner, S. R., Dentist, Bazaar Street, Maryborough.
Volbon, E. A., Bundaberg.
Vernon, Dr. G. H., M.C., Thursday Island, Torres Straits, Queensland.

LIST OF MEMBERS—*continued.*

Waddell, W. A., J.P., "Hiawatha," Esplanade, Cairns, Queensland.
Walker, E. E., Manager National Bank of Australasia, Gympie.
Walker, Captain T. W., Albion Street, Warwick.
*Wallace, W. A. J., Survey Office, Quala Lumpur, Federated Malay States.
Walsh, A. D., J.P., FELLOW, General Manager, Messrs. Dalgety and Co., Elizabeth Street, Brisbane.
Walsh, E. P., Chemist, Mary Street, Gympie.
Walsh, J. A., Messrs. Fitzgerald and Walsh, Queen Street, Brisbane.
Warren, C. C., 24 Wharf Street, Brisbane.
Warrian, C. G., Local Hon. Sec., "Sibdon," West Street, Toowoomba.
Watson, The Rev. A. T., Local Hon. Sec., The Manse, Warwick.
Watson, R. P., Limestone Street, Ipswich.
Watson, W., Chemist, Margaret Street, Toowoomba.
Watts, J., J.P., Corinda, near Brisbane.
Webb, G. S., c/o Messrs. Groom and Lavers, Margaret Street, Toowoomba.
*Weedon, H. S., C.E., L.S., Box 44, G.P.O., Sydney, N.S.W.
*Weedon, W., Selby House, Wickham Terrace, Brisbane
Weir, W., Town Clerk, Sydney Street, Mackay.
Wetherell, R., Manager, Brabant and Co., Charlotte Street, Brisbane.
†Whatmore, G. W., Director and Manager, Queensland Motor Agency, Adelaide Street, Brisbane.
White, Miss Helen, M.A., Principal, Girls' Grammar School, Ipswich.
White, W. T., Authorised Surveyor, "Wynola," Campbell street, West Toowoomba.
Whitehead, A. E., Chemist, Nicholas Street, Ipswich.
Whitehead, R. H., Stewart Street, North Bundaberg.
*Whittingham, Hon. Arthur Herbert, M.L.C., "Mayfield," Hamilton, Brisbane.
Whittle, Dr. H. C., John Street, Maryborough.
†Wilkinson, L. A., Chemist, Queen and George Streets, Brisbane.
Williams, His Worship Alderman Arthur F., Local Chairman, Metropolitan Hotel, Albert Street, Mackay.
Williams, Chas., care of Q.A.T.B., Alfred Street, Mackay.
Williams, F. Stanley, Sydney Street, Mackay.
Williams, Jas. F., "Wahroonga," North Street, Mackay.
Williams, W. W., Land Commissioner, Cloncurry.
Willis, J. L., 27 Salstone Street, Kangaroo Point, Brisbane.
Wilson, A. W., J.P., General Agent, Charters Towers, Q.
Wilson, Dr. G., M.A., Brisbane Street, Ipswich.
Wilson, John P., J.P., FELLOW, 478 Adelaide Street, Brisbane.
Wilson, W. A., J.P., FELLOW, Flinders Parade, Sandgate.
Wilson, W. B., Grafton Street, East Warwick.
Winnett, W. G., Slack's Creek, Kingston, Queensland.
Wonderly, Mrs. R. G., "Caloola," Taylor Street, Toowoomba.
Wood, Miss Dorothy M., Box 531, G.P.O., Brisbane.

LIST OF MEMBERS—*continued.*

Woodard, Miss A. T., c/o Mrs. Hermitage, Edmonstone Street, Newmarket, Brisbane.

Woodward, F. G., National Bank of Australasia, Ltd., Brisbane Street, Ipswich.

Wyper, W., Merchant (Managing Director Wyper Bros.), Bundaberg.

Yearwood, Miss E. M., "La Fortune," Perrott Street, Paddington, Brisbane.

Young, Henry S., Fairymead Plantation, Bundaberg.

Honorary Members.

H.H. Prince Roland Bonaparte, 10 Avenue d'Iena, Paris, France.

Professor Sir T. W. E. David, K.B.E., C.M.G., D.Sc., F.R.S., University, Sydney, N.S.W.

Lady Goold-Adams.

F. W. Gregory, Sydney, N.S.W.

P1 The Right Hon. Lord Lamington, G.C.M.G., G.C.I.E., B.A., F.R.G.S., Hon. F.R.S.G.S., &c., Lamington, Lanarkshire, Scotland.

Lady Morgan, "Mia Mia," Foxton Street, Indooroopilly, Brisbane.

Lady Nelson, "Gabbinbar," Toowoomba, Q.

Lady Norman, London, England.

Viscountess Novar of Raith, Kirkcaldy, Scotland.

Associate-Professor T. Griffith Taylor, D.Sc., B.E., F.R.G.S., University, Sydney, N.S.W.

Honorary Corresponding Members.

Cyrus C. Adams, F.A.G.S., Editor "Bulletin of the American Geographical Society," Broadway, at 156th Street, New York City, U.S.A.

P2 His Excellency Sir W. L. Allardyce, K.C.M.G., Government House, St. Johns, Newfoundland.

P2 Dr. J. V. Danes, Consul-General, Czecho-slovak Republic, 40 Bayswater Road, Darlinghurst, Sydney, N.S.W.

P1 Professor Richard Elwood Dodge, Teachers' College, Columbia University, New York City, U.S.A.

Dr. Karel Domin, Asst. Professor of Botany, Bohemian University, Prague.

His Honour Dr. W. F. Frear, 303 Stangenwald Buildings, Honolulu, Hawaiian Islands.

Very Rev. D. M. Gordon, C.M.G., M.A., D.D., LL.D., Principal Emeritus, Queen's University, Kingston, Ontario, Canada.

Hon. W. T. Harris, Ph.D., LL.D., late Commissioner of Education, Washington, D.C., U.S.A.

The Hon. W. A. Holman, K.C., Ex-Premier of New South Wales, Northfield Chambers, Phillip Street, Sydney.

LIST OF MEMBERS—*continued.*

Sir G. R. Le Hunte, K.C.M.G., Steepleton Manor, Dorchester, Dorset, England.

Sir J. Scott Keltie, LL.D., Editor "Statesman's Year Book," &c., Royal Geographical Society, Kensington Gore, London, S.W., England.

P2 R. H. Mathews, L.S., Associé étranger Soc. d'Anthrop de Paris; Corr. Memb. Anthrop. Soc., Washington; Corr. Memb. Anthrop. Soc., Vienna; Local Correspondent for Australia, Royal Anthrop. Inst. London; "Carcuron," Hassall Street, Parramatta, N.S. Wales.

Cathcart, William Methven, M. Inst. C.E., F.R.S.E., F.R.I.B.A., Club Arcade, Durban, South Africa.

P3 H. R. Mill, LL.D., D.Sc., F.R.S.E., F.R.G.S., F.R.S.G.S., Hill Crest, Dorman's Park, Surrey, England

Dr. Eric Mjöberg, Director Sarawak Museum, Kuching, Sarawak, Borneo.

Rev. Dr. E. F. Pigot, S.J., Science Master and Director of the Observatory, Riverview College, Sydney, N.S.W.

Captain G. H. Pitt-Rivers, A.D.C., Federal Government House, Melbourne, Victoria.

P3 Captain J. F. Ruthven, R.N.R., F.R.G.S., Junior Carlton Club, Pall Mall, London, S.W.

Mr. J. H. Spowers, Federated Malay States.

Frederick Stubbs, F.R.G.S., Rotorua, New Zealand.

Mrs. J. P. Thomson, Eagle Junction.

Rt. Rev. Gerard Trower, D.D., Bishop of North Australia, Port Darwin.

A. J. CUMMING, Government Printer, Brisbane

QUEENSLAND GEOGRAPHICAL JOURNAL

(NEW SERIES).

INCLUDING THE PROCEEDINGS OF THE ROYAL GEOGRAPHICAL SOCIETY OF AUSTRALASIA, QUEENSLAND.

39th SESSION, 1923-24.

J. P. THOMSON, C.B.E., LL.D., HON. F.R.S.G.S., ETC., ETC., *Honorary Editor.*

The Authors of Papers are alone responsible for the opinions expressed therein.

VOL. XXXIX.

PUBLISHED AT BRISBANE BY THE ROYAL GEOGRAPHICAL SOCIETY OF AUSTRALASIA, QUEENSLAND.

NOTE.—All communications should be addressed to the Hon. General Secretary, at the Rooms of the Society, Public Library Building, William Street, Brisbane.

The Royal Geographical Society of Australasia

(QUEENSLAND). Founded 1885.

40TH SESSION.

OFFICERS:

Patron :

His Excellency Rt. Hon. LORD FORSTER, G.C.M.G., Governor-General, etc.

Vice-Patron :

Rt. Hon. W. M. HUGHES, K.C., etc.

President :

His Excellency Rt. Hon. SIR MATTHEW NATHAN, G.C.M.G., F.R.G.S., etc.

Vice-Presidents :

His Grace ARCHBISHOP DUHIG, D.D.

Hon. W. F. TAYLOR, M.D., F.R.G.S.A. Hon. E. G. THEODORE, M.L.A.

Hon. General Secretary and Treasurer :

J. P. THOMSON, C.B.E., LL.D., Hon. F.R.S.G.S. (Edin.), etc.

Council, 1924-1925 :

F. B. C. FORD, Esq., F.R.G.S.A.
Hon. W. N. GILLIES, M.L.A.
Prof. E. J. GODDARD, B.A., D.Sc.
A. HERTZBERG, Esq.
F. J. MORGAN, Esq.
Prof. H. C. RICHARDS, D.Sc.
L. A. WILKINSON, Esq.

Hon. Librarian :

HUGH MACINTOSH, Esq.

Bankers :

THE BANK OF QUEENSLAND, LIMITED, AND COMMONWEALTH SAVINGS BANK.

Hon. Auditor :

Major A. J. BOYD, F.R.G.S.A.

Hon. Lanternist :

H. W. MOBSBY, Esq., F.R.S.A., F.R.G.S.A.

Hon. Solicitors :

Messrs. J. F. FITZGERALD and WALSH.

Contents.

VOL. XXXIX.

	Page.
The Geographical Distribution of Cotton, by G. Evans	1
Queensland's Artesian Basin, by B. Dunstan	20
A Patrol in New Guinea, by H. M. Saunders	22
The Age of the Earth, by W. H. Bryan	39
The Geography of Population, by Sir George Knibbs	46
Primitive Man as a Hunting Companion, by Capt. A. Wienholt	63
Anniversary Address, by His Excellency Sir Matthew Nathan	76
Proceedings of the Royal Geographical Society of Australasia, Queensland	84
Annual Summary, 1922-23	85
Provincial Branches	88
The Thomson Foundation Medal Awards	88
Diplomas of Fellowship	89
Foundation Members..	90
Members, List of	91
Honorary and Corresponding Members	104
Conditions and Privileges of Membership	Page 2 of Cover
The Thomson Foundation Gold Medal, Conditions of Award and of Competition	Pages 3 and 4 of Cover

ROYAL GEOGRAPHICAL SOCIETY,

LONDON.

CONDITIONS OF FELLOWSHIP.

The Royal Geographical Society (London), our parent Society, is desirous of increasing its fellowship with those anxious to further the promotion and diffusion of geographical knowledge by their interest and support as well as with those able to take a more active part in the work of discovery and exploration. The entrance fee of the Society is £5, annual subscription £3, and candidates have to be proposed and seconded by Fellows. Members of the Royal Geographical Society of Australasia (Queensland), desirous of becoming members of the Royal Geographical Society of London should communicate with Dr. J. P. Thomson, Honorary General Secretary of the Queensland Society.

Queensland
Geographical Journal

No. 25. New Series. 1924. Vol. XXXIX.

GEOGRAPHICAL DISTRIBUTION OF COTTON PRODUCTION, MANUFACTURE, AND CONSUMPTION.*

With Special Reference to Australian Conditions

By G. Evans, C.I.E., M.A. (Cantab.), Director of Cotton Culture in Queensland and of the Empire Cotton Growing Corporation.

The serious shortage of cotton that exists throughout the world at present renders the subject of this lecture of perhaps more than passing interest. Its importance will be realised by people in Australia in general and by residents of Queensland in particular, because, as you all know, strenuous efforts are now being made to establish the cotton-growing industry on a permanent basis in the Commonwealth. Queensland especially seems to be a State well suited for the cultivation of this crop.

The British Empire consumes an enormous amount of raw cotton each year, the Lancashire mills alone requiring about three and a-half million bales, and it is a remarkable fact that we do not produce more than a fraction of the cotton that we require for our consumption. The present shortage, which is mainly due to the reduced yields of the crop in U.S.A., has emphasised this point, and has brought home to everyone in the Empire the grave danger in which we stand at the present time. Not only are our great manufacturing industries languishing on account of the scarcity of raw cotton, which we can only buy at a great price and

* Address to the Royal Geographical Society of Australasia (Queensland), 30th April, 1924.

with difficulty after the great producing countries have satisfied their own wants, but cotton is one of the most important of all war materials.

It will be seen, therefore, that of the three headings into which my lecture has been divided, that of the actual production of the raw material is by far the most important at the present time, because if raw cotton is not made available in sufficient quantities, the manufacturing industries must necessarily be seriously affected and the consumption will be correspondingly lessened.

In this lecture, therefore, I propose to devote most of the time to the questions concerning the production of the raw material, and shall then discuss the manufacturing and consuming areas.

I shall avoid statistics as far as possible, because I know that a mass of figures generally prove uninteresting and tiresome to an audience, but will endeavour to speak in general terms, and will also try to stick to the geographical aspect. It is proposed to deal with the situation first from the world standpoint, and then go into more detail so far as Australia and Queensland are concerned.

The Conditions Essential for Production.

Everybody realises that cotton will not grow everywhere. Even where the climate and soil are satisfactory for the growth of the plant, certain economic factors may exist which prevent the successful cultivation of the crop on a commercial scale. The incidence of diseases and pests is also very important, since if they are prevalent, cotton production is naturally hampered.

Climate.

The cotton plant requires considerable warmth and moisture for its satisfactory growth, and it is therefore grown only in the tropics and sub-tropics. About six or seven months are occupied in the growing and complete maturing of the crop. In other words, there must be a period of from 180 to 210 days between the last spring frost and the first autumn frost, because the plant is damaged by a few degrees of frost. During the growing season a mean average temperature of 65 deg. to 80 deg. is desirable, and the temperature should, further, be fairly uniform, since the plant is sensitive to sudden changes and checks tend to produce

premature ripening. During the first two months of growth fairly cool weather and a fairly light rainfall are desirable, as the plant then develops a good root system, becomes tough and hardy, and form the fruiting habit. A somewhat heavier rainfall and warmer weather is desirable during the middle season, when the plants are putting on fruit. During the last two or three months a lower temperature and drier conditions are necessary to check vegetative growth and enable the bolls to ripen. Fine, dry weather is also essential during the picking season, to enable the crop to be picked clean, since in bad weather the fibre is apt to become stained.

The rainfall most suitable for cotton varies between 25 in. and 40 in., varying with the latitude, class of soil, &c. In some countries, such as Egypt and the Punjab, where the rainfall is deficient, the necessary moisture is supplied by irrigation. Generally speaking, the heavier the rainfall the lighter and better-drained the soil and situation must be, because waterlogging is fatal to the cotton plant. Probably the highest rainfall under which cotton is actually grown as a commercial crop is in the Garo and Chittagong Hill tracts, on the borders of Assam, Burma, and China. Here the rainfall during the growing period is extremely high, averaging about 90 in., and the type of cotton grown (*G. aboreum assamica*) is probably the shortest commercial cotton in the world, the staple being very rough, harsh, and coarse, and being chiefly used for upholstering, linoleums, or packing, and not for spinning. Attempts to introduce a better quality cotton have been made from time to time, but have failed, and even this poor type of cotton can only exist in this rainfall for the simple reason that the seed is planted on the steepest hillsides and thus gets complete drainage at the root.

In most of the cotton-growing countries of the world cotton is grown on a variety of soils, but, speaking as a general rule, the most suitable soils are always those of fair depth and consisting of good medium loams, containing a fair amount of sand and silt along with a good natural drainage and a fair capacity for retaining moisture.

Economic Factors.

The economic factors that are of importance are the incidence of population on the land, the state of development of railways, roads, and ports, and proximity to markets.

It is necessary to realise that cotton requires more labour than many other crops. A good farmer may be able to plant quite a large area, but he will require to employ extra labour at two periods during the growth of the crop. The first of these is the thinning-out and chipping stage. The seed is planted in rows, and when the young plants are about 8 inches high they must be thinned out and all weeds cleaned out from between the plants. If this operation is delayed the plants assume a wrong habit of growth, and the subsequent yield is greatly reduced. To some extent the necessity for employing labour at this stage may be obviated by mechanical means, but, speaking generally, the method of thinning out by hand has up to the present been found to be the most suitable. The second period when labour is absolutely necessary is during the picking season. The cotton plant, unlike many other commercial crops, ripens unevenly, so that unripe bolls, ripe bolls, flowers, and squares are usually found on the plant all at the same time. This necessitates going through the crop three or four times for picking. In wheat and other cereal crops the whole ripens more or less evenly, so that it can all be harvested at the one time and in one operation. This, as I have pointed out, is not the case with cotton, and, although a number of machines have been invented and claims have been put forward that the problem has been solved, it is noteworthy that none have yet been adopted on a commercial scale. These machines are designed either on the suction system or on the principle of a series of bristles which entangle the ripe fibre and carry it to the picking receptacle. Without going into details, it may be mentioned that the chief obstacles operating against the success of these machines are, firstly, that the grade of cotton picked is low, owing to the amount of trash and leaf that is picked with the cotton; and secondly, the amount of damage that is done to immature bolls and squares by the machine during its passage through the field. It is just possible, of course, that a successful picking machine will eventually be produced, and when this has been achieved it will mean a revolution in the cotton-growing industry, since the scarcity of labour and the high cost of hand-picking is undoubtedly prohibiting the rapid introduction of cotton cultivation into several parts of the world where the conditions are otherwise favourable. It would certainly have a very important effect in Australia for the above-mentioned reason, since here agricultural labour is scarce on account of the sparse population, and agricultural wages run higher than in most countries on account

of the higher standard of living. If successful mechanical cotton-pickers are eventually to be introduced, however, I think it will necessitate close co-operation between the mechanical engineer and the scientific plant-breeder. The latter's aim would be to breed a compact type of plant which would mature the whole of its crop of bolls, or, at any rate, the greater part of it, more or less at the one time.

Pests and Diseases.

The cotton plant, like other highly specialised cultivated crops, is very liable to insect pests and fungus diseases. The Mexican Boll Weevil (*Anthonemis grandis*), for example, has seriously reduced the yields in the U.S.A. The following statement shows this very clearly:—

Five-year Periods.	Average Acreage.	Average Yield, in Bales.	Average Yield per acre, in lbs.
1910-1914	35,900,000	14,259,221	192·1
1919-1923	35,200,000	10,531,415	146·9

In other words, the average acreage during the five post-war years is only slightly less than that of the five years immediately preceding the Great War, and yet the crop has dropped by three and three-quarter million bales, because the yield per acre has become much less. This decrease may be ascribed mainly to the depredations of the weevil, either directly or indirectly, although other economic factors have had some influence. The greater part of America's cotton belt is now infected, and in an attempt to outrace the pest large areas are now being planted in Virginia and Southern Illinois, where the crop has hitherto been practically unknown.

Similarly, the Pink Boll Worm (*Platyedra gossypiella*) has caused great damage in many countries, such as Egypt, India, the African Colonies, Brazil, &c., so much so that practically every cotton-growing country, where the pest is known to occur, has had to bring in special legislation with a view to combating this pest. Other pests and certain fungus diseases also occur and do much damage, and it is for this reason that certain areas, more particularly those within the tropical zone and with a humid climate, have found it impossible to produce cotton as a paying

commercial crop. On the other hand, countries further away from the equator, possessing a colder winter season, sometimes find that pests can be more easily controlled. Clean cultivation is an absolute factor, and it is because this point is not clearly realised by the grower that cotton-growing is so hard to establish in some of the countries where this crop is new.

The Cotton-growing Countries.

According to the International Agricultural Institute of Rome, the average area under cotton from all the countries in the world furnishing data was about fifty-eight and a-half million acres in 1921, or slightly less by one million acres than the ante-war period. The total yield of cotton was estimated at something under twenty-one million bales. By far the largest producer is the United States of America, with an area varying from thirty-three to thirty-eight million acres, and an output of ten and a-quarter million bales in 1923-24, or 51 per cent. of the world's total output. India comes next with about twenty-two million acres and five million bales. The area under cotton in China is unknown, but it is probably very large, and she produces at least two million bales. Egypt usually has about one and a-half million acres, and she produces round about one million bales. This is a high yield per acre and is a testimony to the fertility of her soil, the excellence of the irrigation system, and the skill and industry of the "fellahin." Other countries, too numerous to mention, make up the remainder, but some of the more important of them will be mentioned later.

A glance at the map indicates that the areas under cotton cultivation are mainly sub-tropical, and not tropical as is so often supposed. In only a few instances do these areas extend beyond the 40 deg. parallel north (China, Korea, Turkestan), and only in South Africa, and in New South Wales, and on the Murray in Australia do they approach below the 30th degree in the Southern Hemisphere.

The sub-tropical areas produce practically the whole extent of the crops in the United States, Russia, Asia, and China, with portions of the Mexican, Indian, Persian, and Egyptian areas, as well as South Africa and Australia; also the limited areas along the Mediterranean, Cyprus, Malta, &c.

Within the tropics are found the West Indies, Peru, Brazil, Tanganyika, Uganda, Sudan, and the West African colonies; the

peninsular of Queensland, Cambodia, and the West Indies, &c. It is worthy of note that by far the greater part of the cotton is grown in the Northern Hemisphere, and that the great cotton-producing areas are those in which not only is the climate suitable but also in which agricultural labour is plentiful and has, up to recent years, been comparatively cheap—India, China, and Egypt are instances. The U.S.A. has also achieved her prominence as the leading cotton-producing country in the world owing partly to her abundant and efficient labour. Brazil is rapidly forging ahead as a great cotton country, and is solving her labour scarcity and filling up her vacant spaces by an influx of immigrants. Before the war these mostly came from Central and Southern Europe, but during the last few years the tide of Japanese immigration has set in very strongly, and thousands are now entering each year from that country and engaging to a great extent in the cotton-growing industry.

The lands south of the equator are not nearly so closely populated or highly developed as those north of the line, but it seems likely that the present century will see this state of affairs changed, and that they will produce a bigger proportion of the world's crop in the near future.

Let us now turn briefly to Russia's cotton-growing area in Turkestan. This area affords a sad illustration of the extent to which a large agricultural industry can be ruined by the calamity of war or a political revolution. Russian Turkestan, as has been mentioned before, is the furthest north of all the important cotton tracts. The country is practically rainless and is surrounded by desert, and is dependent largely on irrigation. The climate is very cold in the winter, but the summer, although comparatively short, is extremely hot. Early maturing varieties of cotton are successfully grown under these conditions, and the cold winter keeps down the pests, minor damage being only occasionally caused by flights of locusts. With the outbreak of the Russian Revolution the whole industry became upset, the growers left or were unable to cultivate, and the canals fell into disrepair, so that Russia, which in 1913-14 produced nearly a million bales, is only estimated to produce 180,000 bales in the coming season.

This potentially great area is bound to recuperate in time, however, and again take her place as one of the big cotton-producers of the world.

Cotton-growing Areas in Australia.

I have gone into some detail in discussing this somewhat remote area, because it seems possible that the climatic conditions there are somewhat similar to those of certain parts of Australia, where thoughtful people are now considering the possibilities of introducing cotton-growing. The particular areas meant are in the drier areas of this continent, along the Murray and Murrumbidgee Rivers. Here cotton, if it can be grown, will have to be irrigated. The winters are cold and the growing season is short, but the summer, like that of Turkestan, is hot, owing to its proximity to the enormous arid interior of this continent. There would seem to be no reason why cotton should not grow and yield well in these areas, provided an early maturing variety of the right type is cultivated. In this connection it is probable that a close investigation into the methods of cultivation employed and the types of cotton used in far-away Turkestan, where cotton-growing has already proved a pronounced commercial success, would be amply worth while.

This is the only part of Australia where cotton is likely to be grown under irrigation just now, although it is possible that when the irrigation schemes that are now maturing in Queensland, west of the Main Range, begin to function, it may pay to grow cotton with the help of irrigation water.

Northern Territory and the North-West.

The main crop of this country will, however, be rain-fed and not irrigated. Apart from Queensland, which is the main cotton-producing area and which we shall again refer to presently, this crop has been successfully experimented with in parts of New South Wales and the Northern Territory, and is also being tried in the north-west of Western Australia. In these two latter areas it is noteworthy that the summer temperatures are high and that the rainfall mainly falls during the growing period of the crop. An interesting illustration of this necessary correlation of rainfall and temperature is shown by a reference to the rainfall statistics of Western Australia. In the southern portion, as far up the coast as Geraldton, the rainfall falls almost entirely during the winter months, with the result that the main crops are the cereals of the temperate zone—viz., wheat, oats, &c. In the middle belt, although the summer is hot, the total rainfall is very light and is not sufficient

for the cultivation of any crop, except under irrigation, which is not at present available. The whole of this vast area is therefore pastoral, and is one of the most important wool-raising tracts in the world. In the neighbourhood of Broome, however, monsoonal influences begin to appear, and from thence northwards the country has a summer rainfall which is said to be as much as 70 in. in the neighbourhood of King George IV. Sound. At Derby the rainfall is over 30 in., but the amount of land available for cotton does not at present seem to be very large, although the Western Australian Department of Agriculture may eventually discover a suitable area within reasonable distance of a port. It must be remembered that the greater part of this country has never been properly surveyed from an agricultural point of view. The highlands consist of light, sandy-red soils, which have no subsoil, and are consequently liable to dry out very quickly and to become extremely hot on the surface. The alluvial flats along the river valleys are, on the other hand, subject to inundation, and are therefore unsuitable for cotton. There are indications, however, that in the valley of the Drysdale River and in the country between Wyndham and Hall's Creek, the climate and rainfall are both suited, and that large areas of suitable soil also occur. The prohibiting factors at present are the lack of population and the lack of communication and facilities for getting the crop down to port, and so to the markets. Similarly, in the Northern Territory the rainfall is monsoonal, falling entirely in the summer months. There is remarkably little land within 200 miles of the coast that is suitable for cotton. The land between the valleys consists of thin soils overlying clay pan, and the chief features are the pandanus palm, which usually indicates a water-logged soil, and the enormous anthills, which are generally taken as showing that the soil is hungry. The alluvial flats along the big rivers, such as the Daly and the Adelaide, are extensive in the lower reaches, but are liable to flooding, and, from what little I was able to see of them, would be best suited to the cultivation of wet rice or jute. Both these crops require a dense population to be successfully dealt with, and, as we all know, this is not forthcoming at present. I am not a sufficiently good geologist to hazard a statement, but it seems just possible that the whole of the north coast of this Continent is gradually sinking. If this is so it would account for the reason why all the alluvial flats and river valleys are so liable to inundation. In the upper reaches of these rivers, along the coastal

belt of the Northern Territory, the alluvial lands are narrow and somewhat infrequent, and the rainfall is likely to prove somewhat too heavy and continuous for cotton. I did not, in fact, come across any really large body of land suitable for cotton cultivation until I got to the Roper River, some 300 miles south of the coast, although a few patches of fair land occur along the Katharine River and some of the creeks. In the Upper Roper valley, however, it should be possible to grow excellent cotton, given the necessary agricultural population and facilities for marketing and handling the crop. The land consists of large areas of sandy to medium alluvial loams, situated above flood level, and the rainfall is not too heavy, but is regular and consistent, averaging about 32 in., all of which fall in the growing period. The picking season has fine weather, and it should be possible to keep the pests in check by means of burning the old stubble and rubbish at the end of the dry season. The new extension of the railway from Katharine to the Daly Waters will open up this country and solve the difficulty of handling the crop. The progress of cotton-growing in these areas will, however, depend entirely on the success that attends any scheme for settling an agricultural population on the land. The aboriginal population is fairly thick, and I personally think that, if treated properly, they can be relied on to give a good deal of casual labour in the initial stages. The few settlers who are attempting to cultivate the land at present in these parts are employing the aboriginals for clearing the land, weeding, and thinning the crop, and also for picking. Although not, of course, adepts, the work I saw them doing was quite satisfactory, considering that most of them have never been engaged in agricultural operations before. Many of these people are of fine physique and are certainly not devoid of intelligence, and for casual labour such as is required during the picking season and for thinning I have no doubt they will prove of great assistance to the pioneer farmer in these parts. Whether any large influx of settlers will be attracted to these parts I cannot say, but I should imagine that the less remote parts of Australia will be occupied first.

New South Wales.

Turning now to New South Wales, we find that considerable attention is being paid to cotton in the valleys running east from the Main Range to as far south as Sydney. Both rainfall and summer temperatures are suitable for the growth of cotton in these parts. On the coast itself and at the mouths of the rivers flowing

into the sea it is possible that the rainfall may prove too heavy and the atmosphere too humid in the autumn during the picking season. Fifteen or twenty miles inland, however, these conditions disappear, and the result is that cotton of the finest quality has been grown on the middle and upper reaches of the Richmond, Clarence, and Hunter Rivers. On the upper reaches, when the rainfall averages 26 in. to 32 in., the most suitable soils would appear to be the sandy alluvial flats which cover large areas along these valleys.

On the west side of the Main Range experiments are being carried out, and it seems probable that this valuable money crop may be introduced in parts of the north-western and central-western slopes, where the necessary summer rainfall occurs. Both these areas have a somewhat short season, however, and it is possible that early ripening varieties will give the best results.

Queensland.

Turning now to Queensland, we find that the temperature is everywhere suitable for the commercial cultivation of the crop except on the higher elevations at the top of the Main Range, in such localities as Stanthorpe, which is probably too cold. In Queensland the rainfall is the limiting factor. The rainfall map of the State indicates that the incidence of rain over an average of years is curiously uneven. We have wet belts, such as the Tweed, Nambour, Bundaberg, Proserpine, and Mackay, and further north at Innisfail and the Cairns country, in which the rainfall is probably too heavy over a series of years to suit cotton. In one or two of these areas where the rainfall is not much more than 40 in. it is possible that cotton may grow well on the lighter soils and in well-drained situations. Generally speaking, however, the plant is inclined to put on too much wood in these tracts, and attacks of diseases and pests are more prevalent. Some of these diseases are indirectly encouraged by the humid atmosphere. Thus an internal boll rot disease, which is prevalent on the coast, is caused by certain sucking bugs and grubs which puncture the boll and incidentally let in the spores of a certain fungus which could not otherwise gain entrance. This fungus then sets up a rot and destroys the young cotton, and is causing damage chiefly in the coastal belt.

Speaking generally, therefore, we find that the conditions which are most favourable to the production of a commercially paying crop exist in a belt of varying width between the New South Wales border and Mackay. The average rainfall in this belt varies from 25 in. to 40 in. or so, and the area of land comprised in this cotton belt amounts to many millions of acres.

It is necessary to point out that the whole is not culturable, however, as the area I have indicated is extraordinarily broken up into narrow valleys and plateaux, with large areas of rocky ranges and ridges covered with indifferent and shallow soils, which are only useful for light grazing. Nevertheless the total area of good cotton land that is available for development is very large, and when we remember that other large areas occur north of Mackay which have not yet received much attention from a cotton point of view, I think you will agree that we have in Queensland one of the few large untapped potential cotton-growing areas remaining in the world.

The soils in this area are extraordinarily mixed; in fact, to a person accustomed to large cotton-growing countries in other parts of the world, this fact is very forcibly driven home. In India we find thousands of square miles of black cotton soil in the Deccan and Berar, and the same occurs in Texas, whilst in Egypt and Mesopotamia one is dealing all the time with an alluvial soil. In the Queensland cotton belt, with rare exceptions, this is not the case. You may be standing on a deep black clay valley bottom, which emerges on the slopes into a chocolate loam covered with silver-leaf ironbark trees. Within rifle shot in one direction you may see cotton growing on a light red powdery volcanic soil of great depth and famous for its prolific maize and fodder crops, whilst at an equal distance in another direction one may drop down into a shallow valley, and admire some extensive alluvial flats of splendid sandy loam in which the typical tree is the Moreton Bay ash, a sure sign, as a rule, of a first-class cotton soil. Again, a few miles further on, the eternal gums of the Australian forest may give place to a different flora, and we may find ourselves in a thick scrub of deciduous bushes and trees, prominent among which is the well-known bottle tree. This, however, is not a treatise on ecology, and enough has been said to indicate the extraordinary variety of the soils and the intricate way in which they occur. Experience is beginning to teach us that all these soils are not equally suited to cotton, and that year in and year out certain

types are more satisfactory than others. Farmers in the south-east and the Maranoa now realise to a great extent that the medium and sandy loams are the most suited, one of the reasons being that if properly cultivated they retain moisture well, and an early plant, which is essential for the greatest success, can then be obtained. The heavy black soil may give good results in certain years, but is more difficult to work up into a seed bed and is hard to keep free of weeds during the rainy period.

The boom period of cotton is now passing, and we are all getting down to hard facts, and one of these is that cotton, if a good paying crop is to be obtained, must be farmed properly, just as any other crop is. Slip-shod cultivation is fatal. It is also beginning to be realised that it has its own requirements regarding class of soil, methods of cultivation, &c. It will have its ups and downs, such as any other crop will have in a climate such as that of Queensland, where the rainfall is not entirely dependable, but it is now believed that cotton, *if properly farmed*, is more likely to give a crop during a semi-drought period than any other commercial crop. It also has the further advantage that its price is not dependent on the local market, and is not therefore subject to sudden and distressing drops owing to over-production. Cotton is a world commodity, and we all believe that the shortage of raw cotton is such that the price is not likely to drop for a good long time.

With regard to pests we have our troubles, since they have proved destructive in some parts this year. Pests, however, are generally bad after a drought, and cotton, it must be remembered, was not the only crop attacked. Other countries have, however, the same pests that we have, and by the adoption of sound precautionary and remedial measures (of which the most important are clean farming and a "dead" season) have continued to keep them in check. It is difficult to believe that the Queensland farmer cannot do the same. Finally, we must remember that we have not got the boll weevil, which, perhaps, is the most destructive of all cotton pests and the most difficult to combat.

Having discussed briefly these factors in the successful production of cotton in this State, we now turn to one of the most important factors of all—namely, that of population. Owing to the scarcity of population it is unlikely that cotton will be grown in Queensland to any extent on the plantation system. The tendency is for a farmer to put in a few acres of cotton along with his other

crops. In other words, he goes in for mixed farming, thereby planting and cultivating as much cotton as he, with the help of his family and a few friends, can pick. By so doing he nets a return which helps to materially swell his credit balance at the end of the year. The tendency is all in this direction this year, and is shown by the fact that we have about 60,000 acres under the crop grown by about 8,000 or 9,000 farmers. This area in a normal season would be expected to yield about 20,000 bales, with, let us say, at the current prices, a value of about £700,000. Let us presume that there are an equal number of farmers who farm land in the cotton belt who are not yet growing cotton. Should they take up cotton-growing we might possibly get double this output, or even if the season were exceptional, even 50,000 bales. That would be somewhat about our limit at present, and we cannot hope to get much more, unless land is taken up for cultivation inside the cotton belt *much more quickly than is happening at present.*

When we realise that the world's shortage of cotton is about three million bales, it will be seen that Queensland's possible contribution towards meeting the deficiency is a somewhat modest one, at present, although the potentialities undoubtedly exist.

Manufacture and Consumption.

Cotton a Compartively Recent Commercial Product.

It is not generally known that cotton has sprung into importance comparatively recently, and it is difficult to realise that a little more than 200 years ago cotton was practically unknown to civilised western nations. It was, of course, known before that in the East, but was not so important as other fibres, and the Sanskrit word "Karpasia" originally meant flax, and not cotton. Herodotus, in 450 B.C., refers to a cotton material, but this is probably the Kapok (*Bombax malabaricum*), the silk cotton tree which is so common in the East Indies. By the beginning of the Christian era, however, Indian cotton is first mentioned in commercial circles, and the painted calicoes of Masulipatam and the famous muslins of Dacca were beginning to be well known.

It is only in the last century and a-half, however, that cotton has come into its own. In 1784 the British Government seized eight bags of cotton imported from the United States of America, on the ground that no such large quantity of cotton could have been produced in that country! To-day it is estimated that the

world's total consumption of cotton would, if the purchasing powers of the people were normal, be in excess of twenty-two million bales, of 500 lb. net (lint).

The Reason for its Rise in Importance.

The first cause of this tremendous increase was the introduction of textile machinery. The spinning jenny was invented by Hargreaves in Lancashire in 1764, and since then continual improvements have been made, until the modern textile machinery has been evolved. The introduction of machinery enabled fibres to be made up into fabrics at a greatly reduced cost, and therefore a greater demand arose, necessitating the use of a cheap fibre. The advantages hitherto enjoyed by cotton have been a relative abundance of supplies and a low price as compared with other fabrics of a similar nature, such as silk, flax, and even hemp and jute. The two former, in particular, were not only more exacting in their requirements, but were more expensive to produce.

About fifty years ago cotton was chiefly used for wearing apparel, and apart from sail cloths, tents, &c., the demands for it from other branches of industry were negligible. Production was, therefore, limited to the purchasing power of people for clothes.

Within the last forty years, however, the use of cotton has extended far beyond that of producing clothes for the peoples of the world. The price depression in the "nineties" caused cotton to become so abundant and cheap that it began to be used as a substitute to replace other products. Trials in this direction indicated that cotton was not only cheaper but was often more satisfactory than the original product, and further experiments resulted in still further uses being made of it, so that in many industries it has now become an essential for which no substitute can at present be found.

New Uses for Cotton.

A few examples of these new uses may prove interesting. With the rising price of leather it was found that heavy duck or rubber, with a basis of cotton, proved an efficient substitute for belting, and thousands of bales of cotton were required annually for this purpose. In the same way cotton bags have largely displaced wooden barrels in transporting substances such as cement, lime, &c.

Another very large consumer is represented by the railways of the world. Thousands of bales are consumed annually in the

manufacture of air-brake hose, of fabrics for seats and cushions, whether plush or artificial leather, and for enamelled ceilings, which are usually cotton cloth covered with a coating of enamel.

An industry of quite recent development is the automobile business, and this has now become the greatest single consumer of cotton and cotton goods in the United States. That country has an annual output of two million cars or so, and it is obvious that the amount of cotton required for tyres, hoods, seats, and cushions must be enormous. One tyre-manufacturing company alone is reported to use 120,000 bales or thereabouts each year, and it is evident that the time will not be far distant when half-a-million bales at least will be required for the automobile industry. Finally, there is the use of cotton as a war material. Nowadays cotton comes next in military importance to chemicals, copper, and petroleum. It provides, not only clothing for the soldiers, but tents for their shelter, tarpaulins for stores, and sand bags for the trenches. It is also one of the most important essentials entering into the manufacture of high explosives. Warships use an enormous quantity of cotton for awnings, &c., and it is, of course, largely used in the construction of aircraft.

The Present Shortage.

In other words, the utilisation of cotton in so many new industries has caused a greatly increased demand within recent years, which the producers of raw cotton have barely been able to meet. Following on the serious position as regards supply, which was evident before the war, that great calamity resulted in an enormously increased consumption, with the result that the reserve stocks rapidly disappeared and do not now exist. There is therefore a great rise in prices, and extraordinary endeavours are being made in many parts of the world to grow more cotton. The present shortage is somewhere about three million bales, and it will probably take many years of strenuous endeavour to make the supply approximate again to the demand. There seems to be no prospect of any material drop in the prices for some time to come in the existing circumstances.

The Consuming Countries.

In the old days cotton was mostly grown in the East, and was there made up into cloth on hand looms. In those times piece goods were actually imported into Europe by the Western nations. With

the invention of textile machinery, towards the end of the eighteenth century, however, industrial centres arose in Lancashire and other parts of Europe, and a rapid change in trade relations resulted. The better-educated and more industrially efficient Western nations found that they could afford to import raw cotton from the growing countries, and by reason of the cheap methods of textile machinery make it up into cloth and export and sell it at a profit overseas.

The rapid rise of the United States as a cotton-growing country, coupled with the introduction of steam power into ocean-going vessels, enabled the cotton so produced to be transported cheaply and rapidly to the mills in the industrial centres of Europe, and this gave rise to the great textile industries that we know of to-day in Lancashire and other centres. The American Civil War caused a serious depression in the Lancashire cotton industry, and it is interesting to note that even in 1863, as a result of the shortage of raw cotton directly resulting from that war, there was an outcry against the continuance of dependence on the United States of America for supplies of raw cotton. With the establishment of normal conditions in the Southern States and the rapid settlement of further cotton-growing areas, however, the supplies again became large, and the Franco-German War of 1870, which seriously upset the textile industry on the Continent, further strengthened the English manufacturers.

Even at this stage, however, the tendency had arisen for the cotton-growing countries to start manufacturing their own cotton goods, and this tendency has increased rapidly within recent years, so that not only the U.S.A. but other cotton-producing countries, such as India, China, Brazil, and Egypt are now making up large quantities of their raw product. The following figures are instructive and illustrate this point:—

ESTIMATED NUMBER OF SPINDLES (000's OMITTED).

——	1880.	1900.	1920.
Great Britain	41,000	42,460	58,692
U.S.A.	10,700	28,349	35,834
Continent of Europe ..	21,500	40,577	43,264
India	1,700	5,657	6,689
Japan	..	3,690	3,690
China	..	..	1,600

This table shows clearly that the U.S.A., India, and China are all now manufacturing their cotton, and that less, therefore, is available for the manufacturing but non-cotton-producing countries, such as the European countries and Japan.

The U.S.A. mills were, until comparatively recently, mostly located in the Northern States outside the cotton belt, but there has been a tendency of late to erect mills on the spot where the cotton is produced. Probably the idea is that in lean years these mills will be in a better position to secure supplies of cotton. Possibly, also, labour conditions may be easier. In any case it is a remarkable fact that whereas in 1860 Southern State mills only consumed 178,000 bales, in 1921 they purchased nearly three million bales.

The proximity to supplies is not, however, the only factor that tends to favour the establishment of cotton manufacturing mills. The nearness and extent of the markets has also to be taken into consideration, and the standard of technical skill and the capability of hard, honest, and intelligent work that the inhabitants are capable of producing, have to be borne in mind. In the latter respect the European countries had for many years a comparative monopoly, and were at a great advantage compared with the Oriental nations, which were more behindhand in this respect. The recent rise of Japan can be instanced, however, as an example of the way in which a nation can rise successfully over obstacles of this sort. This country buys most of her cotton from India, but more recently has also been purchasing better quality fibre from America and other countries. She has made herself to learn the intricacies of the textile trade, and has a large and ready market at her door, not only at home with her large population, but in China and the other countries of the East with their teaming millions. India also has her market within herself, and not only produces the cotton, but has natural resources in the shape of coal and cheap labour. Her industrial education has been less rapid, however, and her progress has not therefore been so phenomenal as that of Japan.

The U.S.A. appears to be the best situated of all nations for cotton manufactures. She has a large internal consumption which requires cotton, not only for clothing fabrics but also for many other highly organised industries, and she has an intelligent and skilled industrial population, great material resources in the shape

of oil, coal, and water, and in addition produces the bulk of the world's cotton. Many people believe that in a few years' time the United States will consume all the cotton she produces, and that there will be little left for export. Compared with the States, Europe seems to be badly situated, in that she produces practically no cotton and has to import all of it from overseas, often from a considerable distance. It must be remembered, however, that she has a large market right at her doors, and a market that in normal times can pay well and requires the finest materials. Further, her cotton-manufacturing industries are highly specialised and the workers have an apparently hereditary skill in their work. The machinery used is up to date, coal is abundant, climatic conditions are particularly favourable, and the markets are well organised and established. The tendency for Lancashire, in particular, is to concentrate on the manufacture of high-class goods, which some of the other countries new to the industry cannot at present emulate.

One of these days it is possible that Australia will manufacture cotton goods, but the most important work she has before her just now is to produce more cotton. Queensland's cotton output last season was 7,736 bales only. A modern spinning mill will consume somewhere about 40,000 bales in a year, and owing to our distance from other cotton-growing centres it is doubtful whether it would pay to import in large quantities. Moreover, our population is small and the internal market is therefore necessarily limited, and since the costs of producing manufactured articles in this country are high, it is doubtful whether it would pay to export at present rates.

With an increased population and more people growing cotton, however, it would seem that some time in the future Australia will naturally take to manufacturing her own cotton goods.

QUEENSLAND'S ARTESIAN BASIN.*

By B. DUNSTAN, Chief Government Geologist.

The geological structure and the limited potentialities of the Queensland Artesian Water Basin was the subject of a lecture delivered at the Royal Geographical Society's rooms by Mr. B. Dunstan, the Chief Government Geologist. A large number of coloured lantern slides were used to illustrate the numerous geological features existing in this wonderful geological formation, and other slides were used to illustrate some ideas propounded by the lecturer regarding the longevity of the flowing bores which have proved to be of such great value to the pastoralists of Western Queensland.

The artesian basin was described by means of geological sections extending from the mountains of Papua, across Torres Strait to Cape York Peninsula, and down through the centre of Western Queensland to Winton and Lake Yaama Yaama. Other sections showed the geological developments across South Australia to the Great Australian Bight, at Eucla, the length of the whole north-east and south-west line of section being about 2,000 miles. The lecturer stated that the artesian basin may be broken or dislocated to the south of Papua in crossing under the Gulf of Carpentaria, as there is evidence to show that Queensland is not receiving any artesian water from that direction, and that probably a break occurs in the Gulf of Carpentaria. At Eucla artesian beds almost certainly exist below the surface, but probably this end of the basin is detached sufficiently to prevent any of the artesian water flowing into the sea in this part of Australia. Therefore, except for the narrow leakage into the Gulf of Carpentaria, the artesian basin is practically sealed up.

Along the course of this long line of section from Papua to Eucla, the altitudes of the artesian beds are somewhat remarkable. The Papuan end is 10,000 feet high, then a depression exists going south to the Gulf of Carpentaria, which gradually rises out of the sea to form, further south, a dome or submerged elevation below the flat country away to the north-east of Cloncurry. The beds then become submerged to a depth of 4,000 feet at Winton, and to a depth of probably 7,000 feet further south at Lake Yaama Yaama, which is equal to a depth of about 6,500 feet below the level of the sea. From this lake the beds rise south-west to Patchewarra, in South Australia, and come

* Abstract of lecture delivered by B. Dunstan, Esq., Chief Government Geologist, 13th March, 1924.

to the surface at Hergott Springs, forming a done on the Mount Stuart Ranges further west, and falling again to sea-level at Eucla, just on the Western Australian border. Between the elevation of 10,000 feet in Papua and the depression of 7,000 feet at Lake Yaama Yaama there is a difference of 17,000 feet in elevation, and this amount of movement must have developed from what was once practically level country, and typified by the surface of the country as it exists to-day between the Gulf of Carpentaria and Lake Eyre in South Australia.

Many phases exist in the work of investigating artesian water problems, such as working out temperatures at great depths, source of supply of artesian water, composition of the water, leakage at mound springs, fossils occurring in the artesian zone, pre-existing geographical conditions, prevalence of salt in artesian water, the diminution of bore flows, and the means to prevent exhaustion, so that the greatest attention is required at the hands of those who have charge of this important asset to Queensland.

The statistics compiled from various sources show some interesting points. In 1914 Queensland emptied out of the artesian basin by means of bores about 500,000,000 gallons of water per day, while in 1923, in nine years, the yield had decreased to about 300,000,000 gallons per day. This represents a diminution equal to 4·6 per cent. per annum, and notwithstanding that during these nine years three hundred additional bores were sunk. If we average the yields with the number of bores, we find that the decrease is 6 per cent. per annum.

The importance of these bores to Queensland is realised from the following figures:—The number of artesian and sub-artesian bores in Queensland is 2,906, and in New South Wales 506, which is about one-sixth of the number in Queensland. The total depth of bores in Queensland is 3,600,000 feet, in New South Wales 800,000, or one-quarter the length in Queensland. The total daily flow in Queensland is about 300,000,000 gallons, while in New South Wales it is 85,000,000 gallons, or about one-third of Queensland's yield.

Finally, we must realise that provision must be made, even though we are so much better off than New South Wales, to carry on our Western pastoral industry when nearly all the bores cease to flow by virtue of this annual reduction. In fifty years' time we would be obtaining absolutely much less than 20,000,000 gallons of artesian water per day, and this flow would be no more than is now being obtained by about fifty ordinary bores at the present time.

A PATROL IN PAPUA.*

By H. M. Saunders, F.R.G.S.

Samberigi Patrol.

Papua, or British New Guinea, comprises the south-eastern portion of the Island of New Guinea. Its total area is, roughly, 90,500 square miles (nearly one-seventh that of Queensland), and its coastline is estimated at 3,600 miles, or half as much again as that of Queensland. Papua is bisected roughly by what is known as the Main Range; that is to say, the Owen Stanley Range, which runs south-east and north-west; and this range forms the watershed of a large system of rivers, many of which are navigable for some distance for launches of shallow draught. Round the coast are many harbours, and usually near these harbours are situated the European plantations. Being in the tropics and fairly close to the line, Papua is subject to the climatic conditions of such regions. There is a certain amount of malaria, but I think that if one looks after one's self and takes ordinary precautions, the white man can keep himself fairly fit. It cannot be said that the climate is bad; in fact, in some of the higher country it is very fair.

The territory is administered by a Lieutenant-Governor, (Colonel J. H. P. Murray, C.M.G.) and an Executive Council of five—three unofficial members being added to this number to form a Legislative Council. For purposes of administration, the territory is divided into several large areas, each in charge of a resident magistrate or an assistant resident magistrate. Detachments of native police are stationed at the various divisions. These police are a splendid body of men and perform acts which, if done anywhere else than on lonely patrol, would receive high recognition. I do not think I am saying too much when I maintain that, considering that perhaps only a generation ago these men were practically in the Stone Age, the Papuan police force might well be classed as one of the best bodies of native police in the world.

The policy of the Government in opening new districts—by that I mean other than those where arrests have to be made—is one of peaceful penetration. The first duty of an officer is to endeavour to make friends of the new people, and this is done by

* Read at a Meeting of the Royal Geographical Society of Australasia (Queensland), 12th June, 1924.

going to the new district under the guidance of some native friendly with them, and also by offering presents, such as axes, knives, calico, and, in some of the high countries, salt; and I must say in my small experience this scheme has usually worked very well. To give some idea of the work of the average outside officer on patrol, I will tell you some experiences that happened while I was engaged on a patrol into new country some little time ago.

I was stationed at Kikori, in the Delta Division, at the time, and our objective was what is known as the Samberigi Valley, which had been passed through by the Hon. Staniforth Smith about 1910. He had reported that he had seen evidence of a large population residing in this valley. This report had been substantiated by the late Mr. Wilfred Beaver, who was in command of one of the relief expeditions which were sent out in search of Staniforth Smith. The valley apparently lay over a mountain which we could see from Kikori, and which we called Mount Murray. We started from Kikori with supplies for three months, including about 120 bags of rice. When going into new country one must make good provision, as, unless in a populated part, one cannot depend on living on the country. The carrier will carry food for himself to last a month; so if one carried a bag of rice, and another a fly or a tent or something like that, it will be seen that the food would only last the two of them for a fortnight. We were taken up the Kikori River, about 30 miles from the Government station at Kikori, by the Government launch, towing canoes; and the whole of our gear, food, flys and carriers, police and ourselves, were deposited in a place known as the "Base Camp," used by Staniforth Smith in his expedition. Here we cleared the scrub and made a camp. The party now consisted of Mr. Flint (Assistant Resident Magistrate) in charge, myself, fifteen native police, and seventy-five carriers. Mr. Flint, realising that the key to the situation lay in finding an intermediate people named "Bara," who were slightly known to the Government people at Kikori, had some time previously been up to their village, named Sebereu, which by the way had never before been visited by white men. He had made friends with these villagers and told them he wanted a guide to take him over the big mountain, which lay to the north, into the valley known as "Samberigi." They denied all knowledge of the valley, so he left a lot of trade goods in the village, and displayed more, telling the people that whoever took him to the Samberigi would receive all this trade.

Our first objective was Sebereu, a distance of about 25 miles from the base camp. Having 200 odd loads, and only seventy-five

carriers, we proceeded to march as follows:—One of us would go ahead for a couple of hours' journey with the carriers fully loaded, and make camp, sending the carriers back to Number 1 camp. They would probably come back the same day with another load, sleep at Number 2, and go back early the next morning for a third. The other officer, who came along with the last load, would pass through Number 2 camp, carry on a few more miles, and erect Number 3; and so that same procedure would go on. We took four days to do the 25 miles to Sebereu.

Arriving there, to our great satisfaction we found a man who the people said would take us over the mountain. They said he was a chief of a tribe named Okani, that he had heard that some strange people wanted to see his country, and that they had many steel axes with them. His people wanted steel axes, as at present they only used stone ones, so he would guide us up there.

Leaving Sebereu, we carried on in the same double-banking fashion, when, after a while of very rough going, we dropped into the bed of a dry river. Our guide told us here that we would have to carry water, as in the dry season the creek was dry for a long way, the water flowing underground; whereas in the wet season it was impassable and the people did not travel. The country was getting rougher and rougher, and in places we had to build ladders to take us over the bad coral limestone blocks in the river. One fearful gorge we will never forget, and, though I have been through it three times since, I have always gone through with "the wind up." The passage takes about three hours, and it is about 30 yards wide in places, and rises sheer to 1,000 feet or so on either side. It becomes quite dark in places, and the wind whistles down in a very nasty fashion. This is where we found fearful blocks of limestone fallen down from the sides. We were seven days in this creek, known as Lapi Creek, and glad we were when our guide told us that the next day we should reach his gardens.

I happened to be in the lead when we came to a spot which seemed a bit clearer, and more open now that we were out of the river. We dropped down almost a precipice of about 1,000 feet, and suddenly came out on to gardens. Here, Iari, our Okani guide, suddenly left me and signed to me to wait. I had only one constable with me and a village constable whom I had picked up on the Kikori River, with one of two Bara men who had agreed to come with us a little way. The village constable was a most irritating man, and kept reiterating that we were amongst bad people, and that we should all be killed and eaten. As a matter of fact, I had

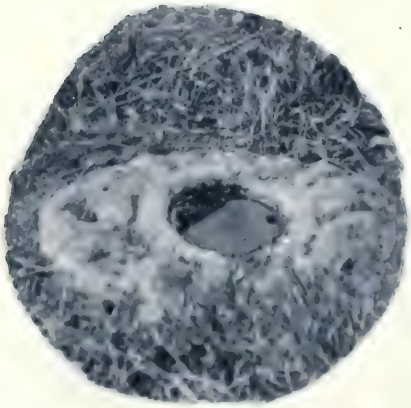
a feeling like that myself, though I knew that the chief was fairly trustworthy—or had been up to now. Suddenly, on the opposite bank two big natives appeared, fully armed. I called out to them but they cleared out. A few minutes afterwards, to my great relief, along came Iari with about ten men. I went towards them with my hand out, but they instantly stopped. Iari was all the time talking to them rapidly, but I suppose the extraordinary sight of a white man—for I suppose we must look rather funny to the warmer-tinted natives—had frightened them. However, after a few minutes they slowly came forward and held out their left hands and we shook hands, and the first introduction was over. Soon afterwards the rest of the police and carriers came along, and we made camp. I sent back a report to Flint, telling him that I had come in touch with the natives, and he came along the next day.

In our party was a Serebi River boy, who could speak to the Bara people, who in turn could speak to the Okani, so our interpretation was through three interpreters—a very difficult proceeding.

Our guide now told us that we should reach the Okani country the next day. "The small valley we were in," he said, "was their gardens," and they brought us a few potatoes, some sugar-cane, and native tobacco; and we gave them calico, beads, &c., in return. The people were very pleased with the calico, never having apparently seen any before. To my surprise, quite a lot were armed with steel axes, and when asked where they got them they shook their heads and pointed to the direction of Sebereu. There was evidently a direct trade route with the coast, though neither we nor they knew it then. The gardens we were in were exactly 3,500 feet above sea level.

Early the next morning we commenced the climb up the big mountain, which was frightfully rough in places. We appeared to go through a gap, the summit of which was exactly 6,700 feet, though the peak of Mount Murray, of which we caught a glimpse on our right, was supposed to rise to 8,000 feet. The air was very cold at that height, and we suffered a lot from thirst; but by tearing the moss off the trees we found, by squeezing it, we could get a small drink. After having a spell on the gap for about an hour, we dropped suddenly down the northern slopes of the range, and after descending about 1,000 or 1,500 feet suddenly broke clear of the dense jungle, and saw in front of us, stretching for many miles east and west, a large, cleared, and evidently well-cultivated valley. It was about 4 o'clock in the afternoon, and the view was really wonderful. Straight to our north we saw range after range

KEAI MAN WITH DRIED FINGERS TIED AROUND HIS NECK.



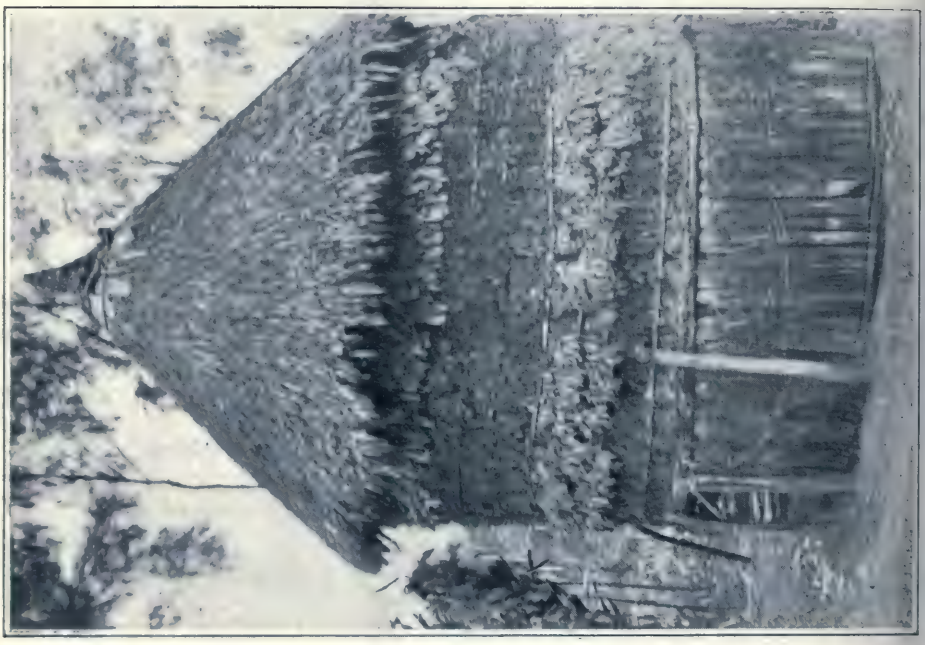
A NATIVE MIRROR OF STONE AND WATER USED BY SAMBERIGI MEN WHEN SHAVING.

towering up. To the west, probably quite a hundred miles away, we saw a huge mountain, which must have belonged to the Snowy Range in Dutch New Guinea. We put the height down to at least 15,000 feet; the peak was blue in the distance. To the east the valley stretched for miles, ending in the inevitable range. Many people came along the track from a small village to meet us, with armfuls of sugar-cane, and lined up on the track as we crawled past. We were taken to a village, which we could see a little way from us, and which the people called "Donaga." We called out "Samberigi," and all the people stamped their feet, pointed to the ground, and shouted "Samberigi." We were evidently there, and we felt rather satisfied that at any rate something had been accomplished and we had arrived. We had taken seventeen days to do the journey from the base camp, and nineteen days from Kikori.

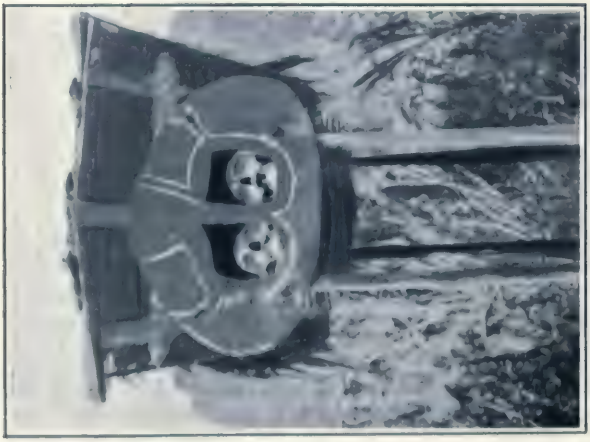
We made a fixed camp at Donaga, built a store thatched with grass for all our rice and supplies, and sent off seven police and fifty carriers back to Kikori after they had had a spell of a day or so. The party after their departure consisted of Mr. Flint, myself, eight police, and twenty-five carriers. We cut down our numbers to the minimum in order to have fewer mouths to feed. We could see that we had much exploration work to do up here, as there were smokes in all directions, and every smoke meant a village and people.

We decided first to try and find some people named "Tugi," reported by the late Mr. Beaver as being very savage and hostile, and as having harassed him for days when he was following the tracks of the Hon. Staniforth Smith. Our Samberigi friends pointed out the direction in which these people lived, but seemed very frightened of them, going through the motions of drawing a bow, hitting their heads with their hands, and making other signs signifying that we should all be killed and eaten. However, after three days' spell we procured guides, our good friend Chief Iari promising to accompany us.

I will digress here and give some description of the people in the valley. Of women we saw no sign, they being kept away until the people were sure of our friendly intention. This is a common thing in the wilder parts of New Guinea, and is a bad sign, showing that the people are prepared to fight at any moment and do not trust the intruders. The men were of fine physique, and being mountaineers, were well developed as to their legs and thighs. The older men all wore a bandeau of small cowrie shells round their foreheads, simply as an ornament. These shells are traded in



THE SHRINE, TANGI



SKULL RACK, TUGI VILLAGE.

exchange for tobacco with the coast people, the middlemen in this particular case being our friends the "Bara" people. They wore a broad bark belt, suspended from which was a small cloth of tapa—that is, a cloth beaten out of the bark of trees, made by the women. The tapa cloth was suspended in front, whilst behind they had a similar garment of grass. In the cold early mornings a long cloak of tapa cloth was worn, folded over to make a kind of cape behind. Many of the men had finger bones of deceased relatives round their necks, whilst others had jawbones, skulls, etc. Nearly all wore bones through their noses. The elder men all had beards, and dressed their hair in waxed ringlets. They were armed with bows and arrows, stone axes, and large spears.

Their houses were usually built on the face of a hillside, one end being flush with the ground, whilst the other end projected over the downward slope of the hill. This end served as a look-out, and also made a good defensive position. Inside were partitions, each partitioned part accommodating two men, with a fire between them. The main house, or "Dubu," was used by the men, the women having their own smaller house in which they lived with the pigs. They were not forbidden the main house, but I do not think were allowed to sleep there. Each village had a kind of village green surrounded by a fence, inside of which was the cooking-house (Sobagi), used, so they said, for roasting pigs, but which we found out afterwards was also used for the roasting of human flesh. The Sobagi was a conically shaped house, about 20 feet high, rather like a Zulu hut, and inside was a seat running all round, and, on the ground, pits with roasting-stones. In each village visited was a kind of skull-house, containing the skull, bones, weapons, and belt of some chief of the village or clan. The land was all cleared and well cultivated with sweet potatoes, yams, bananas, sugar-cane, and a splendid tobacco, of which great quantities were grown. A peculiar feature was a good system of drainage by means of dykes, sometimes 10 and 15 feet in depth. These dykes were used for two purposes—first as a means to get the water away in the big rains, and to prevent the top soil being washed away; and secondly, to prevent the pigs from wandering too far. The soil was of a peculiar reddish clay, something like that of the Toowoomba district, but, judging from the excellent sweet potatoes and other vegetables the people traded with us, it was good.

To carry on with our exploration of the valley:—On the morning of our departure from Donaga we found the whole male population assembled in fighting order. They said that they were

SAMBERIGI MAN.

SAMBERIGI MAN.

coming with us to do in their enemies, the Tugis, thinking the opportunity too good to be missed. With difficulty we dissuaded them, rather to their disgust, Isari especially being "fed up." We passed through many Samberigi villages during the next three days, all much the same as Donaga, and everywhere we went we were greeted with the cry of "Kamio," which means friend, and was an "Open Sesame." We were very free with our trade goods, and gave axes to all the heads of the villages, and calico and mirrors to the others, they in turn bringing us potatoes, and in many cases pigs, much to the joy of our police and carriers. Salt was not appreciated in this part of the country, and we found out the reason was because the people made their own salt, which was a thing unheard of elsewhere. The salt was made out of sago and mixed with the pith of a kind of palm. It was carried about in small slabs like biscuits. At one village named "Masigi" we found a peculiar thing in the shape of a native mirror named "Gaho," made out of a huge fossil scooped out in the centre to a depth of about 6 inches and a diameter of about 4 inches. When filled with water it made an excellent reflector. Our big find of fossils was an important one for the geologists of the world. They were brought south by the Government Geologist (Mr. Stanley), and were exhibited before the Pan-Pacific Conference. From them New Guinea was determined to be in the Cretaceous period.

Leaving Masigi one morning, we crossed a range of very rough country, in places having to cut our way through the thick scrub; and, once across this range, we were informed that we were in the Tugi country. We were told that the word for friend in the Tugi dialect was "amio," so all hands were made aware of this and told to shout it out when approaching a village.

After a heavy march we came in sight of a small house on the top of a hill, evidently a watch-house. Our guides became very, very nervous, and wanted to clear back, but we persuaded them to carry on, telling them that no one could possibly beat the Government and that we were quite safe. Having had a spell at this house, we proceeded cautiously, keeping the carriers and police close up to each other. The track was fearful, across huge slippery trees and big rocks. Flint had a bad fall, but with great pluck carried on, although he must have been in great pain. Soon we came in sight of a big village, surrounded by a stockade about 20 feet high. At the same moment we heard, resounding through the valley, a long-drawn bamboo horn (Kibi). This meant that we were spotted. Soon the whole valley echoed with the "Stand to," "Kibis" being blown.

KEAI MAN WITH LOWER JAW BONE AROUND HIS NECK.

KEAI MAN WITH FINGER JOINTS WORN AROUND HIS NECK.

Approaching the village rapidly, we saw it to be in great confusion—men rushing about with bows and arrows and lining-up at the stockade. One or two rushed down the track and hurled spears into the ground. This is a New Guinea sign that no one must pass the spears, otherwise there will be trouble. In this case we ignored the spears and carried straight on into the village. The people did not stand to fight, but retreated to a small hill. I suppose the sight of two white apparitions was too much for them again. After a short time we persuaded them to come in, Iari calling out that we were friends and that we did not wish them any harm. They came in, in ones and twos, and we shook hands, gave them calico and many presents, and they soon forgot their fear. One very fine man, however, stood in the centre of the square with his arms folded and glared at us. I went over to him with my hand out, but he deliberately turned his back on me with a swing and walked away. I greatly admired that man. He stood up for his country and village and did not intend to have any truck with intruders. I have visited the same village, which is named "Niai," twice since, but have never again seen him. Soon afterwards, making camp about 30 yards from the stockade, we had a crowd of natives round us who were apparently friendly. As dusk came on they slowly went away, and we were left alone; so, after posting guards, we turned in.

At about 9 o'clock we were awakened by Chief Iari, who came with the disturbing news that the people were hostile and were arming and painting themseives for fighting. Iari had crept under the dubu at great personal risk, and had heard the older men inquiring why the younger fighting men had not driven the invaders away. They were taunting them with this, and egging them on to fight, and apparently the younger men were listening to them. This was bad news to us, and especially to Mr. Flint, who had not only had the whole responsibility on his shoulders but was in great pain from the wound in his leg. However, the only thing to do was to turn out and put our little camp in a state of defence. This we did.

We all collected into one fly, made a little breastwork of our rice bags, and armed all our carriers with our trade knives and tomahawks. We spent an anxious night, as there was only a handful of us, and we were 100 miles away from any friends and the track lay over some of the roughest country in the world. We had no idea of the numbers of the natives, though apparently there were very many, as all night long we could see firesticks approaching from all directions, meaning that reinforcements were

A VILLAGE OF KENJOGU IN WHICH THE SHRINE IS BUILT.

HEAD DRESS WORN BY THE WISE MEN OF VILLAGE IN TUGI DISTRICT, MOUNT MURRAY.

arriving in large numbers. Iari told us that before these people fight they sing, so as dawn approached we anxiously waited for the song. Just before dawn, sure enough, it commenced, and the police and carriers stiffened up like terriers. Being out with one of the sentries, watching, I saw many armed men come down to the stockade. As it grew lighter there was much shouting and apparently jeering at us—jumping up and down, and smacking of thighs—then suddenly, for some unknown reason, they went back into the village and no more sounds were heard. Later the people came into the camp as if nothing had happened, but they were all armed, and Iari told us to be very careful, as he had heard an old man telling some of the younger men to kill the white men first, and then they could easily settle the others. After that we forbade any man to come into the camp unless he deposited his axe and spears behind his own stockade. They laughed very much at this at first, but obeyed. They latter on brought a pig as a peace offering, which was accepted, paid for, and eventually, to show them something about the power of firearms, shot. At the sound of the shot they all fell flat down and crawled away on their hands and knees. The chief came down to have a look at the dead pig, and walked away shaking his head. I should like to have known what was in his mind.

After we had spent three or four days with these people they became very friendly and volunteered to show us other villages in their district.

Whilst at Niari we came across the peculiar head-dress named "Tonguna," used in a certain mourning feast. It is rather like a fusilier's busby, and is glued to their head, being also held in place by a cord under the chin. It is apparently put on some months before the feast, and not removed until the feast is over. None of our carriers or police had ever seen anything like it before, although I was told recently by Mr. Chinnery, now Government Anthropologist to late German New Guinea, that the same head-dress had been observed high up the Sepic River in late German New Guinea. On my last patrol to the Tugis I was able to procure one for the museum in Port Moresby.

We spent a fortnight in the Tugi district and had some adventures and saw some strange things. On the road, whilst returning to the Samberigi, we passed through a village named Wapi, recently burnt out, and were informed that the village had been sacked by the Tugis on the day of our arrival at Niai, which accounted for the rather doubtful reception we received at first there. They had made a good job of sacking the village; not a

stick remained standing, whilst amongst the ruins of the main dubu we found the bones of human beings, pigs, &c. We also had a most graphic description from Iari, giving us the details of the tactics used in a raid.

Dropping down the mountain side into the Samberigi again, we were made welcome by the inhabitants of one of the villages which we had not visited. As it was too dark to get timber for our flys, the police and carriers camped in the main dubu, whilst Mr. Flint and myself occupied the cooking-house, in spite of the protestations of my cook boy, who informed us that if we slept in there we should be killed by the ghosts of the various people who had been cooked in the house.

However, we both spent a very good night and slept like tops, not being worried by any ghosts. We were both too tired to care whether they were there or not; what we wanted that night was sleep.

We eventually got back to our base at Donaga, and after a rest explored the north-east portion of the country, for about thirty miles east, but I am afraid I have no time to describe this part of the trip to you.

The time at last arrived when, owing to our rice store becoming very low, it behoved us to make a start back for Kikori. We had been instructed by the Lieut.-Governor to look out for some people named "Keai," also reported by the Hon. Staniforth Smith. It was only as we were on the point of starting back for Kikora that we received information concerning them, two Okanis coming to us with the offer to guide us there if we promised them an axe each. This we were only too glad to do, as we were beginning to despair of ever hearing of these elusive people.

Marching south, over Mount Murray again, we had a very hard four days, one of the worst hardships being the plague of leeches we had to go through. Night after night all hands arrived in camp with legs simply covered with the horrid things. The amount of blood lost by this must have been great, and after our strenuous marching I think the whole lot of us began to feel a bit weak.

However, we at last reached a village of the Keai people, with whom we made good friends. These people were rather unique, in that they wore round their necks a preserved human hand. These hands belonged to a relative, and were preserved by first being carefully roasted over a slow fire and then placed under a sleeping

mat until they were quite embalmed. Here, also, we found an extraordinary practice: in the village we saw a kind of dog kennel, and on inquiry we discovered that the Keai tribe were in the habit of catching young snakes and putting them in this house. After a while, when they grew big, they ate them. What they fed them on we could not find out. I have tried to find out if the same thing is practised anywhere else in the world, but have failed to do so.

We spent a couple of days with these good people and then commenced to make our course to Kikori, marching by compass in the direction we thought Kikori lay. By this time we were running rather short of food, and things were not looking too bright, as we did not know exactly how far we had to go. However, we at last struck a river which our Serebi policeman said was the Serebi River, so we thought the best thing to do was to make rafts. We felled trees and lashed them together, and on top built a kind of platform. We had rather an adventurous time, as the river was full of rapids. Whirling down rapids on an unmanageable raft may be exciting, but it is apt to get on one's nerves, as one never knows what may be struck round the next bend, and the rivers in the district apparently have a nasty habit of suddenly going underground. It is, however, as well not to think of that sort of thing when coming down a new river on rafts. Well, we got through safely and one day reached civilisation in the shape of a Serebi village which we knew, where we procured canoes, and the next day arrived back in Kikori after an absence of about eight weeks, during which time we had covered about 400 miles of new country and found forty-two new villages to put on the map.

This may give you some idea of a patrol into new country.

MOVEMENT OF SAND CAYS.

A Report of the Movement of Sand Cays on the Great Barrier Reef under the Influence of Atmospheric Conditions.*

By Lieut. Tom Taylor, of H.M.S. "Herald."

H.M.S. "Fantome" was surveying a portion of the Barrier Reef during the months of November and December, 1923, in a position about 20 miles 54° from Dunk Island.

In this position are two sand cays, the westernmost one being known as "Beaver Cay," and the other, 2 miles to the eastward of it, as "Cay."

Beaver Cay lies on the south-west of a small coral reef about 1¼ by ½ miles. It is itself roughly 200 by 100 yards, and lies in a N.E.-S.W. direction (*vide* attached tracing). This cay was used by H.M.S. "Fantome" as a station in the triangulation of the area to be surveyed in 1921, and a beacon consisting of a barling and bamboo lashed together with a flag hoisted, was placed in the centre of the cay. A mark was put in the place in 1922, and found to have moved from the position in the triangulation of the previous year.

Again in 1923 it was necessary to erect another mark in the place, and the shape of the cay, as remembered by the officer who erected the mark in 1922, was much the same—the small bay on the S.E. side being still in evidence.

No difficulty was, therefore, anticipated in being able to set up a mark in the same place as in 1922, within a matter of, say, 10 yards. Yet theodolite angles from and to the new mark proved it to have moved appreciably from the position it occupied the previous year.

Having definitely fixed the new position of the beacon, H.M.S. "Fantome" proceeded to Cairns, and remained there a fortnight.

During this period a strong north-westerly blew, and on the ship arriving on the surveying-ground once more, Beaver mark was down.

The N.W. edge of the cay was banked up into a steep "cliff" of about 8 feet high, and the heel of the mark overhung this.

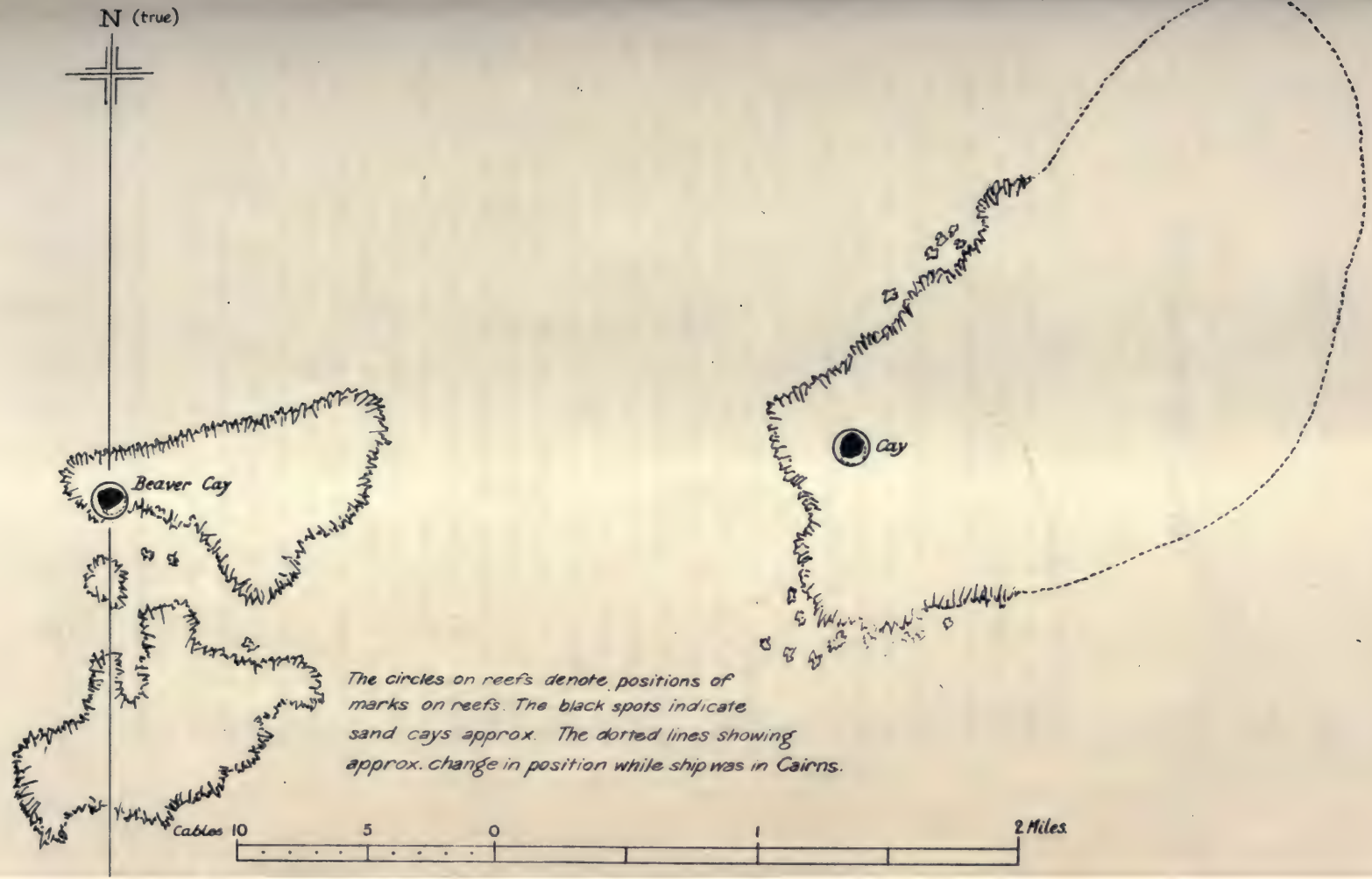
The mark was re-erected in the new centre of the cay, and anchors sunk deep in the sand were used to replace wooden stakes which were formerly used to secure the guys. These held the guys taut successfully through some bad weather for a further six weeks.

On going to recover the mark on completion of survey, it was found that the N.W. anchor, originally some 6 feet in the sand, was awash, and the lee guy (S.E.), which it was impossible to sink, owing to the proximity of the sea, was then buried deep in the sand. Moreover, the mark was no more in the centre of the cay, but near the N.W. edge. This further proves a bodily movement of the cay.

The "Cay," 2 miles to the eastward, acted in a similar way, but had not been used in 1922.

Here we have evidence of a sand cay moving a distance of approximately 100 yards, under the influence of atmospheric conditions. There is every reason to believe that the same conditions would have the same effect on the numerous other cays of the Barrier Reef.

* Contribution No. 2 from the Great Barrier Reef Committee's Reports.


N (true)
Beaver Cay
Cay
The circles on reefs denote positions of marks on reefs. The black spots indicate sand cays approx. The dotted lines showing approx. change in position while ship was in Cairns.
Cables 10
5
0
1
2 Miles

THE AGE OF THE EARTH.*

By W. H. Bryan, M.C., M.Sc.

The Age of the Earth has been the subject of philosophical speculation among the more cultured peoples since the earliest historical records, and the problem of its determination still exercises the ingenuity of experts in almost every branch of science.

The earliest recorded estimate seems to be that of the Chaldean astronomers, who regarded the earth as having existed in its present form for 2,000,000 years. The allowance of the Persian philosophers was less liberal, being only some 12,000 years.

During the middle ages and indeed until the close of the eighteenth century the almost universally accepted opinion was that the earth had been created less than 6,000 years before the birth of Christ. This opinion was fortified by the calculations of Bishop Ussher, who in 1650 concluded that the date of creation was 4,004 B.C., and this date is still to be seen as a marginal note in some bibles. This small estimate was undoubtedly the result of a too-narrow interpretation of the Mosaic records. Its unqualified acceptance by the early geologists, who, even in those days, had recognised both the immense thickness of sedimentary rocks and the slow rate of sedimentation, is difficult to understand until one remembers that the great majority of the scientific workers of those days were ecclesiasts. For them the only possible way of reconciling the geological evidence with their theological doctrine was the assumption of increased intensity of action in geological processes in the past. Hence arose the school of the Catastrophists, who saw in the great quantities of sedimentary rocks and their entombed fossils evidence of a series of tremendous cataclysms which affected the whole surface of the earth, and during which the geologic processes worked at an astonishing rate. These were separated by quiet intervals such as, they assumed,

* Abstract of an Address to the Royal Geographical Society of Australasia (Queensland), 29th August, 1924.

was the one in which we are now living. The last of the catastrophies was supposed to have been the great Noachian deluge described in the Old Testament.

The doctrine of the Catastrophists was in almost undisputed possession of the field until the publication in 1785 of Hutton's "Theory of the Earth," and with it the new doctrine of Uniformitarianism, which held that the geological history of the earth could be and should be interpreted in terms of geological processes identical in type and in intensity with those which we see before us in operation at the present day; in short, that "The present is the key to the past." The new doctrine was thus radically and essentially opposed to the tenets of the old, and since it could in no way be reconciled with the current orthodox belief in the age of the earth, it failed to gain many converts until, some fifty years after its publication, it received the weighty support of the eminent geologist, Sir Charles Lyell. As a result of the wide sympathy which was created by Lyell's championship of Uniformitarianism the church re-examined the bases on which the Ussher chronology was built, rejected his conclusions, and gained its modern broader outlook. With all theological restraint removed, reaction inevitably followed, and the geologists "drew almost unlimited drafts upon the bank of time." There were some, however, more cautious than the rest, who, instead of squandering the years in their millions, set to work resolutely to determine if possible the age of the earth.

The methods which these geologists employed all involved the same principle, that of the hourglass. The length of time for which an hourglass has been in operation can at any moment be simply determined if we know two things. The first of these is the rate at which the sand is running through the narrow neck which connects the two bulbs, and the second is the total quantity of sand in the lower bulb (or, alternatively, the amount of sand which has been removed from the upper bulb). In determining the age of the earth the geologist's hourglass is the earth itself, the upper bulb of which is represented by the land areas and the lower bulb by the seas and oceans, while the narrow neck is found at the mouths of all the rivers and smaller streams which empty themselves into the oceans.

The best-known method of measurement based on this principle involved the estimation of the total quantity of sandstones, mudstones, and other sedimentary rocks which had accumulated since

the geological processes of disintegration of land surfaces and transportation of the disintegrated material to the sea were initiated. A conservative estimate of the total thickness of such rocks, based on the correlation of evidence from many parts of the world, is between 50 and 60 miles. This was divided by the amount per annum at which sediments are being discharged by rivers into the oceans at the present time, which varies with the fineness of the sediments from 1 ft. in 100 years to 1 ft. in 8,000 years. Many geologists, among whom are Geikie and Sollas, have used these methods with varying results, but the best seemed to place the age of the earth at almost 100,000,000 years.

A variant of this method compared the rate at which the land surfaces are being lowered at the present time by the processes of weathering and erosion with the total amount of sediments shown in the geological record. Unfortunately this rate of denudation is as variable as the rate of sedimentation, for while in the basin of the Irrawaddi the land surface is reduced by 1 ft. in 400 years, the lowlands of Canada surrounding Hudson Bay are reduced by the same amount only after 47,000 years. One of the estimates (that of Croll), based on this method, gave the age of the earth as 72,000,000 years.

A similar method to the above compares the amount of material in solution in the oceans with the amount of dissolved material which is added each year by the streams flowing into them. This method was first suggested as long ago as 1715, by Halley (the astronomer after whom Halley's comet gets its name), who suggested measuring the rate at which salt is being added to the oceans. This method has been elaborated by Professor Joly, of Dublin.

The salt in the ocean to-day is an enormous quantity, and would, if it were recovered, be sufficient to cover all the continents to a depth of 120 ft. It is assumed that all this came originally from the land. The amount actually added each year has been computed from numerous analyses of water at river mouths to be in the neighbourhood of 156,000,000 tons. The age as determined by this method is approximately 80,000,000 years.

Sir William Thompson (afterwards Lord Kelvin) took exception to these calculations of the geologists, and accused them of carrying their doctrine of Uniformitarianism to absurd lengths

and of ignoring the basal physical principle of the conservation of energy. Further, he undertook the determination of the age of the earth by purely physical methods.

Kelvin's first essay in this direction was the calculation of the length of time for which the sun had been giving forth heat, for, he argued, this would place a limit on the age of the earth in its present form. The source of the enormous quantities of heat continually emitted by the sun was for long an unsolved problem, but in 1856 Helmholz made the suggestion that the heat was generated by contraction of the sun's diameter under its own gravity. This hypothesis met with general acceptance, and it was on it that Thompson based his first method. It was calculated that a shrinkage of the sun's diameter of 200 ft. would supply heat enough for one year. Assuming that the sun had contracted from what was in the first place a tenuous nebula, such a rate would provide heat for 20,000,000 years. If, however, the interior of the sun is assumed to be much denser than the surface, a much larger figure (in the neighbourhood of 100,000,000 years) is found.

Kelvin next attacked the problem from a consideration of the thermal energy of the earth.

The earth is continually losing heat. This is shown by the temperature gradient (about 1° C. in 100 ft.) found by boring and shaft-sinking. Now the average conductivity of rocks has been found as the result of numerous experiments, and from these two facts can be calculated the amount of heat which the earth is losing each year. Assuming that the heat which the earth is losing is all part of the residual heat possessed by the earth when passing from a liquid to a solid condition, Kelvin calculated the amount of heat which the earth possessed at the moment of solidification, and, dividing this by the heat loss per annum, he arrived at estimates which varied from 20,000,000 to 90,000,000 years.

The third of Kelvin's methods was based on the tidal retardation of the earth. Astronomers have long suspected that the rate of rotation of the earth is gradually slowing down, and Adams has calculated that the amount is twenty-two seconds per century. The cause of this retardation was thought by Kant to be due to the tides which sweep across the oceans in a direction opposite to that of the earth's rotation and thus act as brakes upon the rotating earth. Kelvin, assuming that the earth had maintained

the same shape since its solidification, calculated the rate of rotation of a molten mass to produce the polar flattening and equatorial bulging which we now see in the figure of the earth. Knowing the present rate of rotation and the rate of retardation, a comparatively simple calculation gave Kelvin values ranging from 100,000,000 years as a minimum to 1,000,000,000 as a possible maximum value for the age of the earth.

It might not be out of place to mention at this point Sir George Darwin's calculation of the age of the moon. Pickering had put forward as a tentative hypothesis the idea that the earth early in its history had given birth to the moon as the result of a huge disruption, and that the Pacific Ocean was the scar consequently left on the earth. Acting on this suggestion Darwin calculated that immediately after this supposed event the moon would revolve about the earth in the same time that the earth turned on its axis; that is, the month was equal in length to the day, both being of about three hours' duration, and that this was at least 60,000,000 years ago.

As a result of a reconsideration of the results at which he had arrived, Kelvin concluded that the earth was not nearly so old as the geologists thought, and ultimately narrowed down his estimate to 20,000,000 years.

The geologists thought it impossible to squeeze the whole of geological history into such a short period, with the result that one of the most famous controversies in the history of science raged around the question, with Huxley and Geikie as the champions of the geologists, while Kelvin and Tait urged the case for the physicists.

This controversy was brought to a close by the discovery, in 1903, by Curie and Laborde, of the fact that radium, in its disintegration into other elements, liberates a quite considerable amount of heat. This added to the further discovery that radioactive materials were very widely, though sparsely, distributed in the rocks of the earth's surface, meant that quite a new and hitherto unsuspected source of heat was available to explain in whole or in part the thermal properties of the earth, and, by analogy, those of the sun. Hence the first and second of Kelvin's methods, which were based on assumptions of other sources for all the heat of these bodies, had necessarily to be dismissed.

Further, the study of the phenomena of radioactivity suggested quite a new method of attack on the problem under discussion. The element uranium, it was found, was unstable, and was continually disintegrating through a series of other elements, namely radium, radium emanation, and polonium, each of which was unstable, to the stable end-product, lead. Hence every mineral containing uranium will in time have part of that uranium converted into lead—the longer the time the greater the proportion of lead. So far as our knowledge goes, these radioactive transformations are not affected by changes of pressure, temperature, or any other factor. If it can be assumed that the rate has been constant in spite of all environmental changes, the ratio of lead to uranium in any mineral in which these substances are present should give the age of the mineral, for the rate of transformation at the present time has been very carefully measured. Boltwood, Holmes, and Strutt have followed this clue and examined the lead –uranium ratio in many rocks, old and young. It was found that in those rocks, which on geological evidence had long been thought to be old, the ratio was much higher than in those formations which on purely geological evidence were considered young.

The age of the earth as determined in this way is much greater than the estimates based on the earlier methods, the oldest rocks so far examined being from 1,400,000,000 to 1,600,000,000 of years old. According to Joly, however, the basal assumption (that of a constant rate of disintegration of the radioactive material) is disproved by his measurements of the so-called "pleochroic haloes" found round zircon and other radioactive minerals which occur as inclusions in mica. The disintegration of thorium is, according to this authority, a safer guide than that of uranium, and measurements of this give values only about one-tenth those of the uranium method.

The thorium values agree more closely than those of uranium with the results of the old "hour-glass" methods, but the geological assumption of uniformity underlying these have been challened by the late Professor Barrell, whose brilliant researches have led him to the conclusion that geological processes have not been uniform throughout all time, but have been periodic or rhythmic, and that at the present day we are living in a period of exceptionally rapid and intense geological activity. Applying his

hypothesis to the problem of the age of the earth, he concluded that the old results, based on sedimentation, must be far too low. For the oldest rocks he considers an age of approximately 1,600,000,000 years as not improbable. It will be noted that this value coincides with Holmes' determination, based on the uranium method.

The problem of the age of the earth is still unsolved, but as a matter of interest a table of some of the better-known series representative of the geology of Queensland has been drawn up, and the probable age of these, according to Barrell's and Holmes' methods, have been added. To find the view of the more conservative geologists one has merely to divide these figures by ten.

Basalt at Mount Tambourine ..	10,000,000 years
Ipswich Coalfield	160,000,000 years
Brisbane Schists	500,000,000 years
Mount Isa	1,000,000,000 years.

THE GEOGRAPHY OF POPULATION.*

By Sir George H. Knibbs, C.M.G.; Hon. F.S.S.; Hon. M.S.S., Paris; Hon. A.Am.S. Assoc.; M. Int. Inst. of Stat.; Hon. M. Stat. Soc. Hungary; etc., etc.

1. Introduction.
2. Taking cognisance of things.
3. The rate of growth of populations and its meaning.
4. Australia and her surroundings.
5. The nature of a world-population survey.
6. The human factors.
7. Great diversity in the density of populations.
8. The migration-potential.
9. Factors modifying the migration-potential.
10. Effects of inhibiting the migration-potential.
11. Territorial rights and the consequence of over-population.
12. The nature of over-population.
13. The index of jeopardy.
14. Nature of future industrial changes.
15. The vicissitudes of Nature.
16. The future of migration.
17. World-divisions.
18. The growth of populations.
19. Conclusion.

1. *Introduction.*—Commercial geography is concerned with the places of origin and with the distribution of the world's raw and manufactured products. It traces their movement between countries, and the quantities and values concerned in such movement. In this way it throws light upon important economic questions, and upon the political relations of governments. If, however, it be important to trace the movements of commodities, it must, *a fortiori*, be still more important to consider the relation of man himself to the various territories he occupies, and also to trace his movements over the face of the earth.

There is a very special reason for this. The last 120 years have witnessed a marvellous increase in the earth's population. From some 600 or 700 millions in 1804, the numbers grew to 1,850 millions for the present year. The annual rate of this increase was 0·864

* Read at a meeting of the Royal Geographical Society of Australasia (Queensland), 17th September, 1924.

per cent. For twenty-five of the countries which possess accurate statistics, the annual rate of increase from 1906 to 1911 was more than this—viz., 1·159 per cent. The former rate of increase doubles the population in 80·57 years and the latter in 60·15 years. A very simple calculation will show that if such rates continue for 200 years, we shall have a population greater than the world, as it is now constituted, can carry. For example, at the former rate it would have 7,400 millions by the year 2165, or at the latter rate, that number by the year 2104. Facts such as these arrest the attention of all thoughtful people. They indicate really that, as the world is at present constituted, there must arise, inevitably, collisions of interest which can have the most far-reaching consequences upon national existence.

2. *Taking cognisance of things.*—Nations are beginning to take stock of things in general. The International Institute of Agriculture at Rome makes a sort of world-survey of the agriculture of the nations. The United States is also attempting a world-survey, in order, so its agricultural economist explicitly says, "to adjust their production to demands and successfully compete with the farmers of other countries." In regard to foodstuffs the Great War brought into relief the fact that many countries are by no means self dependent, and that they cannot possibly provide for their populations by the products of their own territories.

The investigation of the mineral resources of the earth also call attention to the world-situation. The rates at which the use of coal, fuel-oils, iron, copper, zinc, tin, and aluminium are increasing cannot be maintained. It has been growing faster than the population has grown, and experts have had their attention drawn to the fact that such drafts on the earth's resources reach their limit much sooner than is commonly thought.

3. *The rate of growth of populations and its meaning.*—The rate of population-growth and of increase in the use of substances required by man have been referred to. The significance of continued rates of increase is not popularly understood. The man in the street would not be appalled if he were told that throughout the world 100 persons increased to 101 every year. To him that is a fact of no special meaning. He probably would think it a rather slow rate of progress. But what does it mean? The earth's historical period is, say, about 10,000 years. Suppose that all were derived from a single pair, and that each year the rate of increase was from 100 to 101, and that each person averaged 100 lb. in weight. Well, to provide the material for the bodies of those living at the end of the 10,000 years would take 1,340,000,000,000,000,000,000

times as much material as is in our whole earth—1,340 million million million earths. If man had been on earth for only 10,000 years instead of hundreds of thousands of years, or perhaps more, a single pair would have had to increase only at the annual rate of 0·2666 per cent., say, roughly, from 1 to 2 in 260½ years.

Our ordinary thought is but little involved in an appreciation of secular changes. Even with this small rate of increase one is soon led to colossal figures. For example, if only that small rate were continued, we get, in millions, the following startling results:—

Year.	Population in millions.
1924	1,850
2184	3,700
2445	7,400
2705	14,800

that is, in the year 2445 about as many as the world can possibly carry, and in a period from now less than one-half from the time of Christ, vastly more than it could carry whatever advance in science, in social, economic, and political organisation, and in ethical principles may occur.

4. *Australia and her surroundings.*—It is thus seen that the population survey of the world is a general necessity; exactly at what it should aim we shall consider later. There is, however, one other cogent reason why the matter is especially important to Australia. It is this: that, relatively, Australia is very lightly populated. She has 1·9 persons to the square mile of her area. The countries near her and their populations in millions and densities per square mile are as follow:—

Country.	Popn.	Density.	Country.	Popn.	Density.
Straits Settlements	0.88	551	Nepal	5.60	104
Japan and dependencies	76.99	295	China and dependencies	436.09	102
British India	247.00	226	Feudatory Indian States	71.94	101
Ceylon	4.50	178	The Philippines	10.35	90
Cochin China	3.80	173	Netherlands East Indies	49.16	86
Tonking	6.85	169			
Annam	5.73	144			

It is seen that the countries near to Australia, having an aggregate population of 918·89 millions, just about one-half that of the world, have densities which range from 86 to 551 to the square mile, while Australia with a population of only 5·70 millions, and only about one-thirtysecond of the population of the world, shows a density of less than 2 per square mile, one forty-fifth to one two-hundred-and-eighty-eighth of the population-density of the countries mentioned.

This fact is an ominous one. Do we shut our eyes to it? One may well ask what is its significance, and in what way is Australia to take practical cognisance of it?

5. *The nature of a world-population survey.*—Civilised man lives mainly by agriculture, and even in so far as he lives upon flesh he needs at least pasture lands for his cattle, sheep, and other animals. The fertility of the earth's soils, the time of occurrence, regularity and quantity of the rainfall, and the other general climatological factors affecting his agriculture, are very diverse. The wheat-yields disclose this perhaps as well as any other available information. The average number of bushels per acre in 1921 was as shown in the following table:—

Average bushels of Wheat per acre in 1921.

	Bushels.	Index.		Bushels.	Index.
Denmark	51.0	3.64	Uruguay	16.4	1.17
Netherlands	49.2	3.51	Spain	14.0	1.00
Belgium	42.2	3.01	Jugo-Slavia	13.6	0.97
United Kingdom	35.4	2.53	Australia	13.3	0.95
Sweden	34.9	2.50	Canada	13.0	0.93
Switzerland	32.4	2.31	United States	12.7	0.91
Germany	30.3	2.16	Rumania	12.3	0.88
New Zealand	29.9	2.14	Algeria	12.0	0.86
Egypt	25.4	1.81	Fr. Morocco	11.9	0.85
France	24.6	1.76	Greece	11.3	0.81
Czecho-Slovakia	24.1	1.72	Argentine	11.1	0.79
Japan	21.3	1.52	E. Russia	10.4	0.74
Bulgaria	18.0	1.29	U.S. Africa	10.4	0.74
Chile	18.0	1.29	India	9.7	0.69
Austria	17.1	1.22	Portugal	7.9	0.56
Poland	17.1	1.22	Tunis	7.1	0.51
Hungary	17.0	1.21	A. Russia	7.0	0.50
Italy	16.4	1.17	Average (ar.)	19.95	

The "Index" is the yield divided by the world-average, 14·0. The arithmetical average given would be only for plots of equal size. The real average over all, however, was only 13·27 bushels per acre. China is not included, and as she has produced on limited areas yields as high as 111 bushels per acre and gets excellent results generally, probably the real world-average is *over* 14 bushels per acre. If then, 14·0 bushels be taken as the (approximate) world-norm for 1921, the wheat-yield indexes will be obtained by dividing the above yields by this number. Thus found, they are as shown in the preceding table.

The relative extent of a territory which can be cultivated is self-evidently also a factor showing its population-carrying power. This also varies enormously. The following table shows the

percentage of the total area upon which cereals and food-crops are cultivated. Probably it agrees closely with the possible area. It is seen that it passes through an enormous range:—

Country.	Per cent.	Country.	Per cent.
Czecho-Slovakia	43.1	Fr. Morocco	4.0
Denmark	34.1	Switzerland	3.9
Germany	30.3	South Africa	2.25
Italy	28.1	Canada	2.0
Belgium	27.7	Egypt	1.8
British India	27.6	New Zealand	1.4
Japan	16.70	Chile	0.7
Austria	13.8	Australia	0.4
Sweden	4.3	Tunis	0.1
Argentine	4.2		

The above results show very definitely that the population-carrying powers of different territories are by no means equal. The actual densities of population, however, do not directly reflect this, for agriculturally some countries are over-populated: they cannot grow sufficient food for themselves; others can carry far greater populations than they now do. Hence in order to know how matters really stand, the world needs estimates of the agricultural, pastoral, and forestal possibilities of each territory, so as to ascertain what population under given circumstances it could carry, and what population it does carry. This is by no means a simple matter. India, for example, has been able to carry its existing population because the British nation carried out for it immense irrigation schemes. Before this, it could not possibly have supported 226 persons to the square mile equally well, if at all.

It is not only the fertility and climatological conditions, however, that govern this; the standard of living, and the whole social and economic development, react upon it. The standards of the masses of India, China, Japan, Russia in Asia, &c., are very different from those of the European nations, Canada, and the United States. For this reason a world-survey will require for each territory not only indexes of its fertility, but also indexes showing the standard of living, the social status, and the economic poise of a territory. And in this connection it is well to bear in mind that, as the world's population increases, the people of each territory will more and more be driven to rely upon their own agriculture, unless a very different system of relations between them prevails to those at present existing. It is obvious that, so long as each country is in jeopardy in proportion as its secondary industries are relatively undeveloped, and in proportion as it lacks the wealth and population that can render its reply to attack formidable, so long will the whole scheme of social and economic development reflect this. For

this reason the most appropriate scheme for its increase of its productivity is not always possible, and this is a population-limiting factor.

6. *The human factors.*—Considerations of this nature show that such a survey may give, after all, results which become definitive, if at all, only when the human or personal factor is taken with the environmental. While it is true that man has to depend upon the energies and resources of the system of which his world forms part, and is subject to its vicissitudes, it is true also that the qualities which enable him to exploit them, reveal great differences between peoples. Knowledge, inventiveness, the insight which leads to discovery, purpose, the capacity to create and to regulate the social organism, and the ethical qualities which tend to ameliorate troubles and solve difficulties, to facilitate economic and social development, these are by no means uniformly characteristic of the genus *homo*. Thus one people will create wealth and support a large population, where another people will utterly fail.

By taking an extreme case it is easy to see that inferior and slack groups of people cannot be allowed to hold back human advance. The invasions of America, Africa, and Australia by civilised races, is justified by the increase in the number and improvement in the quality of the populations of these territories. Under the Red Indian mode of life the North American existing population of 146 millions was impossible. Australia's population of aborigines was very small. The population of Russia in Asia is by no means near the agricultural limit.

There is a question in connection with the personal factor that, though fundamental, is by no means answered in the one way. What ought to be the world policy; ought it to be the attainment of a very large population living hygienically as regards body and mind, but humbly, sternly and with a vigorous purpose as regards life-issues, or ought it to be a relatively small population living in luxury and opulence? The decision as to this governs, to a great extent, that which concerns the "standard of living." Climate, to a lesser extent, also affects it, but rather less than one might at first think. This is obvious by comparing the life of the Esquimaux with that of the inhabitants of, say, India. It is immediately evident that when human wants are enormously reduced, more people can live upon a given amount of production, provided those things which ensure a high-degree of productivity are maintained; high-education and an earnest character, for example.

7. *Great diversity in the density of population.*—It will be well here to review more exactly the great diversity of human population.

Obviously desert countries and very cold countries cannot possibly maintain many human beings. Their limits, even if they go beyond existing numbers, must always be small. There are many countries with populations of over 1 million which could easily carry larger populations. The small aggregate population of the whole world has not compelled their closer settlement. Again there are countries with over 2·5 million inhabitants which are fairly dense. In very many cases they are quite unable to feed their people by means of their own agriculture. These different classes of populations are shown in the following table in which the populations are given in millions and the density in persons per square mile:—

Desert Countries.	Popn.	Density.
French Sahara ..	0.80	0.5
Tripolitania ..	1.00	2.5
French Equat. Africa	2.85	2.9
Italian Somaliland..	0.45	3.2
French Sudan ..	2.47	4.0
Arabia	4.50	4.5

Very Cold Countries	Popn.	Density.
Spitzbergen ..	0.001	0.06
Alaska	0.055	0.09
Greenland ..	0.014	0.3
Newfoundland and Labrador ..	0.263	1.6
Iceland	0.095	2.4
Russia in Asia ..	23.3	3.7

Countries with Populations of over One Million and with less than 10 *per square mile.*

Australia	5.7	1.9
Canada	8.8	2.4
Tripolitania	1.0	2.5
French Equat. Africa ..	2.8	2.9
Niger Territory ..	1.1	3.1
Russia in Asia	23.3	3.7
French Sudan	2.5	4.0
Arabia	4.5	4.5
Southern Rhodesia ..	0.8	5.4
Bolivia	2.9	5.6
Anglo-Egyptian Sudan..	5.9	5.8
Venezuela	2.4	6.1
*Oman	0.5	6.1
*British N. Borneo ..	0.2	6.7
Mozambique	3.1	7.3
Argentine	8.8	7.6
Peru	5.6	7.7
Angola	4.1	8.5
French Cameroon ..	1.5	9.0
Brazil	30.6	9.4
Belgian Congo	8.5	9.4
*New Zealand	1.3	12.9

* Outside limits in heading.

Countries with larger Populations of a Density of 110 *per square mile and over.*

Spain	21.3	110	Denmark	3.3	192
Bulgaria	4.9	123	Austria	6.4	199
Jugo-Slavia	12.0	125	Hungary	7.9	222
Greece	5.5	132	British India	247.0	226
Rumania	17.4	142	Switzerland	3.9	243
Annam	5.7	144	Haiti	2.5	245
Ukraine	26.0	149	Czecho-Slovakia ..	13.6	250
Portugal	6.0	170	Japan, &c.	77.0	295
Cochin China	3.8	173	Germany	59.9	328
Turkey	1.9	174	Italy	38.8	329
Ceylon	4.5	178	United Kingdom ..	47.5	391
France	39.2	181	Netherlands	7.5	528
Poland	27.1	184	Belgium	7.5	636

The preceding tables disclose how very diverse is the density of human populations over the earth. Of course, when very small areas and aggregates are taken even much greater density is found, for example:—

Macao	18,716	Fiume	6,226
Malta	1,936	French India	1,354
Bermudas	1,059	Kwan Chau Wan	884
Gibraltar	10,319	Monaco	2,869
Hongkong	1,599	Kwantung	1,240
Barbados	939		

All of these, however, may be ignored in considering the question of the possible distribution of poulations over the earth's surface.

8. *The migration-potential.*—The marked inequalities existing in the density of population distribution indicate the great desirability of an equalising migration where no sufficient reason against it exists. Other things being equal the *tendency* will of course be to migrate from regions of great density to those of less density. But this tendency is affected by other things, among which normally the population-carrying capacity takes first place. For a given type of people and any region, let this capacity be denoted by P and the actual population by P^1: then the region is unsaturated to the extent $P - P^1$, absolutely. *Relatively,* however, it is this quantity divided by the saturation limit of population, viz., P: thus other things being equal the region will tend to attract people to it, and the normal measure of such attraction will be some function of $(P - P^1)/P$. This quantity in the language of algebra may be denoted by

$$i = f\{(P - P^1)/P\},$$

the letter i denoting the immigration-potential; that then is the measure of the normal tendency to attract immigrants. It is not proposed to treat this question here mathematically. It is sufficient to bear in mind the conception of a migration-potential which normally would exist between all parts of the world.

9. *Factors modifying the migration-potential.*—The social and economic organisation of any territory in which each human being finds himself has ordinarily involved him in so many relations therewith that any migratory tendency is to some extent inhibited, and to this may be added that characteristic which usually makes us take the path of least resistance. There is, too, the question of the expense of movement: the uncertainties as to whether a new environment will be agreeable and fortunate for us, or otherwise. These, too, oppose the tendency to migrate. On the other hand, fancy or even reality may picture the new environment as affording an escape

from limiting or unpleasant conditions to which we are adverse. The fancied fertility or freedom of the new country attracts; its imagined scheme of government seems better than that with which we are acquainted; the possibilities of accumulating wealth are deemed to be greater; with the optimistic temperament imagination creates an outlook which attracts; the very real but unknown limitations are not perceived and do not deter, so that actually the normal migration-potential may even become reinforced by factors that actually may not have a basis in reality.

The social and ethical character, the grade of intelligence, the type of culture, the political outlook, the language and ideals of the new countries, may also have their effect either of promoting or of hindering response to the migration-potential. Some have strong aversions from given races and nationalities; they may fear the reaction of them upon their own standards, social, economic, ethical, and cultural. Thus the immigration of certain peoples or of all peoples may be prevented altogether by refusals to allow immigration or emigration, or by greatly limiting it by various conditions.

10. *Effects of the migration-potential.*—When the relations between peoples admit of action in response to a migration-potential, actual migrations of course take place, and the potential diminishes. When, however, they do not, the inhibitory elements are remembered by the people whose response is hindered; and these memories stored, they become part of the "national memory," and react when occasion permits. It is possible to take account of events of this nature, and probably nations who exhibit aversion and hostility to one another would be well-advised to take systematic account of all overt expressions of ridicule, dislike, contempt, and hatred, &c. Many peoples do not prohibit public expressions of the character in question, and their failure to systematically record them is apt to mislead them as to the seriousness of the consequential result. They, of course, tend to hinder those adjustments of all human relations, by means of which populations can best develop in number and character. A really efficient world-survey of population-characters will, of course, take suitable account of matters such as those to which reference has been made.

11. *Territorial rights and the consequence of over-population.*—To every people its own territorial occupation carries with it a strong sense of the right of possession. So long as there are regions in the world requiring more population in order to function normally, the issues between occupants and the rest of the world are of course solvable by migration, provided, however, that occupants are not averse to others coming among them. As, however, territory after

territory approaches the condition of population-saturation, when too, some are already over-populated, an issue has arsien which no person of intelligence will hesitate to face. From an international point of view, and still more from the point of view of a people with insufficient territory for their maintenance and development, the right of all other occupation will unquestionably appear to be relative rather than absolute. In such a case a survey of world-conditions tends to create an opinion that the "right" is certainly only relative, and is moreover to be measured by "effectiveness of occupation." The definition of effectiveness is, however, by no means a simple matter, and a complete consensus of opinion as to what constitutes normal "effectiveness" is not likely to eventuate. This arises mainly from differences of opinion as to what constitutes a reasonable mode of living. What is to be its standard, social, economic, ethical? To what form and grade of civilisation does it give expression? What is its political theory and system and aim of government? In regard to these things the most divergent views are both possible and probable.

The sense in which over-population has already occurred will be considered later. The sociologic, ethnical, and ethical questions with which we are confronted are of the first order of importance. Our attitude to them may be our making or our undoing as a responsible people.

It has to be recollected that throughout the world's history, civilised peoples have gone into other countries and have replaced inferior barbaric peoples; sturdy, vigorous, informed races have possessed themselves of territories occupied by those who do not possess such attributes in the same degree. This and its advantageous effect has been seen in the case of America, South Africa, and Australia. Whether we elect to recognise it or not there is a sense in which all peoples are being weighed in the balances of Destiny. The effectiveness of occupation is a people's best guarantee of its continued possession. And although a slack, selfish, purblind, or self-satisfied people may choose to ignore the gravest of issues, the normal consequences arrive in due time, and from them there is no escape. It may be added that the over-population of certain countries will compel them—"whether they will or no"—to find an outlet, and any people making no real use of great stretches of territory will certainly be challenged to justify their inactivity.

12. *The nature of over-population.*—Since the people of every country are kept in being, a superficial thinker may observe that there can be no over-population. First let it be noted that agriculturally certain countries are unquestionably over-populated: they

cannot meet the food requirements of their own peoples. During the Great War the United Kingdom became alive to this fact in regard to itself. To Germany, Austria, and Hungary the same lesson was brought home. How this is may be readily illustrated. In 1922 Japan proper cultivated the following areas for foodstuffs, viz.:—

Grain.	Rice.	Wheat.	Barley.	Rye.	Total.
1,000 acres	7,680	1,264	1,296	1,633	11,873

This 11·87 million acres did not, however, really maintain her 59·46 millions of people, that is, 5 to each acre. Nor did her 18 millions of acres of arable land. Professor E. M. East, of Harvard, who made an analysis of the whole position, concluded that Japan maintained only 40 millions through her own cultivation; the rest were maintained by food-products from abroad. She had to import very large quantities of rice, beans and peas, and sugar, and to pay for them with the products of her secondary industries.

Taking accounts of imports and exports, Professor East estimates that Germany, France, Italy, and Belgium, feed only 72, 70, 64, and 37 per cent., respectively, of their populations. This would mean that per square mile of territory the numbers maintained by the agriculture of the country itself were respectively 236, 128, 211, and 235, which suggests that on the average over all $2\frac{2}{3}$ acres per person were necessary in Germany and Belgium, and more in France and Italy. East's estimates for these four countries are respectively in the order given:—2·0, 2·3, 2·4, and 1·7 acres of their cultivated land, and Japan 2 acres *for the western standard of living*. In regard to food value the number of calories per person is very much lower for India, Siam, China, Japan, &c., than it is for European and American countries.

It may be thought that it is a matter of no moment whether a country grows or imports its food, since in any case it lives always by its own productivity. This would be true if the world were living in a state of assured peace. But some nations and many individuals believe that they have an inherent right to advance, if necessary, at the expense of others. It has been formally said that in matters of national conduct there can be no real tribunal if itself is sole judge; in the nature of the case its own necessities must govern its conduct. (Friedrich der Grosse, Treitschke, Bernhardi.) So long as this doctrine is recognised as one to be tolerated, so long will it be necessary for countries to develop secondary industries at any cost whatever, in order that they may create weapons of offence and defence; modern engines of destruction depend upon such industries, and any country not possessing them can be attacked

and defeated. *En passant*, it may be noted therefore that a world-survey of populations will include among other things a jeopardy-index, expressing their degree of safety in this respect. This it is seen will involve two things, one the measure in which they are self-contained in respect of foodstuffs and the other the extent to which they are self-sufficient in the matter of their defence.

13. *The index of jeopardy.*—Reference has already been made to the degree of jeopardy to which a people is subject when the territory they occupy cannot meet all their essential wants. This reacts on their life as a community. A people so situated will attract neither immigrants nor capital to the same extent—other things being equal—as one which is not thus dependent. In this respect the contiguity or nearness of a people who may possibly or probably, or certainly will, be hostile is a factor of moment. Doubtless the situation in each relevant regard can be summed up in such a way that an index for each territory can be computed which will express its relative danger. The most difficult element to determine in this is the will force and character of the people.

14. *Nature of future industrial changes.*—A survey of the productions of a country, of its imports and exports, and of the scale of its living—that is, of its use of commodities—will disclose the extent to which it uses its own and foreign agricultural products, its own and imported secondary industrial products, and it is not difficult to deduce from its use how far it is really dependent upon these—in the event of all abondonment of luxury—in the time, say, of national distress. In short, a measure can be obtained of its essential and of its ordinary consumption of agricultural and secondary industrial products. As time goes on the relative values of the two elements of the total consumption will change. As the world's population-density increases, the agricultural element will increase: each country will be compelled more and more to depend upon itself unless the peoples of the world realise that the sociologic and economic quasi-solidarity now existing must become genuine if the reign of peace is to arrive. Recent events have shown that man's accession to a deeper knowledge of Nature has enormously increased his powers of destruction, and relatively thereto have but slightly advanced his ability to ameliorate the evils due to Nature and to his own intense egoism. It has been seen clearly enough that strife between great nations injures alike victor and vanquished, even if the victor were to press the advantages, attained by means of victory, quite ruthlessly. Whether it will be possible for mankind to recognise that personal and national egoisms must be kept in check, for world-wide reasons, remains to be seen. It is certain that an ethical

solidarity of a much higher order than yet exists is an essential to the friendly solution of world-difficulties. In this connection it may be noted that the creation of an appropriate balance between agricultural and secondary-industrial activity will tend to relieve that unrest which arises from the existence of competitions without scruple.

15. *The vicissitudes of Nature.*—Man as a denizen of the earth is often a helpless victim of her untoward manifestations. The Geographical Society of Geneva has decided to issue a periodical entitled "Materiaux pour l'étude des calamités," in which will be published original articles and reviews concerning earthquakes, volcanic disturbances, cyclones, blizzards, floods, droughts, plagues such as locusts, boll-worm, &c., epidemics, and famines,

Australia had bad experiences of droughts in 1877, 1884, 1895 to 1902, 1912 to 1915, and 1918-19. The total numbers of cattle, horses, and sheep were affected as follows:—Those of cattle fell from over 12 million in 1894 to about 7 million in 1902; of sheep from about 106 million in 1891 to 54 million in 1902; of horses from 1.7 million in 1895 to about 1·5 million in 1902. Thus in the case of cattle and sheep nearly 50 per cent. disappeared. We are ultimately wholly dependent upon climatic conditions, but the disasters through Nature's inflictions can often be slightly minimised. Thus though dreadful famines continue in India, the evils of their incidence have been somewhat lightened by British activities; pastoralists in Australia know better how to minimise the evils of droughts though droughts continue. Japan will probably suffer less in future earthquakes owing to what she learnt in the recent one.

The vicissitudes of Nature which are frequent and of serious magnitude are of course deterrent to immigration and not unfrequently lead to some emigration. Colossal disasters through droughts produce economic results of corresponding magnitude, and may be followed by financial catastrophes. Medical science has done much to overcome some of the worst plagues, and will probably soon make all parts of the earth perfectly habitable. Any indexes indicating the deterrent effects of these evils will therefore doubtless rapidly diminish in value; those from earthquake and drought disasters will only be minimised. All of these would of course be suitably taken into account in the world population-survey.

16. *The future of migration.*—The greatest difficulties which at present oppose free migration are those due to the absence of

physical, intellectual, social and economic homogenity in the peoples of the earth. Differences of language, of social and political views, of racial characters and instincts, of traditions and ideals, hinder the free movement of man. So also do mere communal or national prejudices and egoisms. The reactions upon each other of different races needs yet to be systematically studied. The world may be divided roughly into the black, yellow, brown, and white races, the latter including brunettes and blondes, which, however, differ somewhat markedly. The miscegenation question, though important, has, so far, not been by any means thoroughly investigated: doubtless it will be in the near future. Regarding the standard of living the conditions of the modern world will help to minimise the very real difficulties which exist, and will do so rapidly. Western standards which are unduly luxurious cannot continue to increase as they have in recent years: the world-supply of the necessary material will not admit of it, as a review of the facts readily demonstrates. It is of course evident that a people, who have attained to a political system believed to have great merit, and a standard of living regarded as of high value, should be adverse to the admission of migrants who jeopardise either or both. A slack people with a rich territory are secretly or openly opposed to people whose characteristics are thrift, self-discipline, perseverance, energy, and indifference to luxury, qualities, however, which make for national strength, and which conduce to that condition of things through which the world can carry the greatest possible population.

Unfortunately, antagonisms are often based upon ignorance and vanity. Mere differences of language and social habit, to say nothing of colour, awaken suspicion, arouse prejudice, and create an environment of difficulty. By a trick of "national vanity" the best of one's own people are compared with a low-grade among others, with the result that people generally fail to recognise that among all peoples fine characters are very much alike, and evil characters are equally objectionable.

A broad consideration of all the facts show that, as things are, migration should be selective, and should remain so until higher standards than those existing have been reached. In any case the world population-survey must take account of ethnical, social, and racial differentiation.

17. *World-divisions.*—The statistics of the world embrace 24·13 million square miles carrying a population of about 777·6 millions,

say, 46 per cent. of its area, and 42·3 per cent. of its population. If the data so obtained may be taken as roughly applicable to the whole world, the surface would be occupied as follows, the results being shown in millions of square miles:—

Total 52·5	Not specified	22·5	Marsh	1·0		
	Non-productive	13·6	Forests	7·3		
	Productive	16·4	Shrubs	0·2	For seed	0·02
			Pastures	2·8	Industrial crops	0·37
	Total ..	52 5	Arable	5·1	Food crops ..	0·39
					Grasses ..	0·79
			Total	16·4	Cereals ..	3·53
					Total ..	5·1

The results obtained by the Institute of Agriculture at Rome are a beginning (see "Year Book" 1909-1921). A survey of this kind needs to be thoroughly organised. Estimates are requisite of the existing and possible ultimate arable areas and their existing and possible fertility. It is desirable that the "non-specified" should be definitely described; and the nature of the "non-productive" defined. In regard to the distribution of the arable areas, it is also to be desired that the possibility of obtaining food-crops of higher food-value should be ascertained—for example, in the case of maize and rice, the calories per lb. are respectively 1710 and 1640; for rye and wheat they are 1611 and 1560; while for oats and barley they are only 1553 and 1525. Man requires annually about 470 lb. of a mixture of the above cereals for himself, dependent animals, and miscellaneous use. It is thus possible to estimate the population-carrying power of the world from the total of the agricultural areas.

Incidentally it may be mentioned that in 1921 the recorded total of horses, cattle, sheep, goats, and pigs was 1468·4 millions, and in addition to these there were 36·40 millions of buffaloes, 1·14 millions of camels, and also large numbers of asses, caribou, deer, elks, elephants, llamas, reindeer, &c., probably making a total equal to that of the human population. The world-survey will require that the best records available as regard these shall be ascertained.

When such a survey has been made a more exact estimate can be had of the earth's population-carrying power; of the time necessary to advance given stages toward it; of the collision of racial and economic interest which may arrive; and finally of such an adjustment of human affairs as will be possible through friendly effort to create a real solidarity of human interests.

18. *The growth of populations.*—Populations grow by their own reproductive powers and by immigrations exceeding emigrations. The former is known as "natural increase," the excess of births over deaths. A "stationary" population—one neither increasing nor diminishing—solely recruited by births within itself, and characterised by the expectations of life at each age shown in the Australian Life Tables of 1900-1910—would have 23·8 per cent. of its male and 22·8 of its female population under 15 years of age. The Commonwealth Statistician, Mr. C. H. Wickens, F.I.A., &c., has kindly calculated for me the relative numbers which would be under that age if annually it were constantly increasing at the rate of 1, 2, and 3 per cent. instead of being stationary. They are shown in the following table:—

		Per cent.	Per cent.	Per cent.	Per cent.
Constant annual rate of increase		0	1	2	3
Percentage of population under 15 years of age	Males	23·8	30·5	37·3	44·0
	Females	22·8	29·6	36·5	43·3

It may be mentioned that the actual percentage under 15 at the census of 1921 was 31·6 for males and 31·8 for females.

These facts show that in order to increase as fast as the United States did from 1790 to 1860, 44 per cent. would be of the dependent age under Australian conditions. It is self-evident that, in general, a large rate of increase is possible only if a population is very thrifty and hard working or is extraordinarily favoured as regards the natural wealth of the territory inhabited by them, or is dependent in some way upon external wealth. These facts have to be borne in mind in considering the future of any country. For a people to increase rapidly by their own reproductive power they must marry early, and bear children early, and to do this they must practice self-denial and live economically. They can never attain through immigration what is possible by natural increase. For these reasons the geography of population will contain information as to the rate of natural increase, and where there is an admixture of races, the rate for the constituent elements.

19. *Conclusion.*—When in Finland, in 1902, I was given a series of maps illustrating its development from many points of view. These showed, among other things, the distribution of their industries, the water-power available everywhere, the localities of its production, export, &c., as well as its climatology, its physiography, its lines of communication, &c. A world-survey leading to the creation of a series of maps showing its racial or ethnical

developments, its climatology, its economic characteristics in regard to all primary production and secondary industries, is a desideratum. We need for the world, and quite specially for Australia, a survey of its surface which would inform as to the possible uses thereof. We need also to know in relation to this the frequency of disaster of flood or drought; what power is available and upon what scale; what water can be conserved, and what must be allowed to pass from control; what areas must remain forest or be made forest; what pastoral areas are convertible into agricultural; what lines of access are possible to suitable marketing places. These and many other aspects of a country's character touch upon its population-carrying capacity.

Finally let it be noted that with the world facts as they stand, this country clearly will have to elect whether it will rapidly and healthily advance in numbers from within, or will accept them from without.

Assuredly the geographical distribution and conditions of the worlds populations are for the world generally, and for us particularly, subjects of the first order of importance which we dare not neglect, if we are interested in even our own destiny, to say nothing of that of our children.

PRIMITIVE MAN AS A HUNTING COMPANION.*

By Capt. Arnold Wienholt, D.S.O., M.C.

Your Excellency, Ladies and Gentlemen, Members of the Queensland Royal Geographical Society—The pleasure which I felt at the honour of being asked to speak before you this evening was, I admit, somewhat tempered by the thought as to how an old bushman would be able to interest so scientific and serious-minded an audience as that comprising a meeting of your Society. I ask, therefore, your indulgence towards any failing, both on the part of my subject and equally as regards its delivery, from the high standard which is, I feel sure, to be expected at your meetings. I propose with your permission to take you in imagination with me to-night on a lion-hunting expedition into the country of my little friends, the Maquengo bushmen of far south-east Angola.

Their district, really the northern part of the great Kalahari desert, is still but little known to the white man, and I think one may almost count on the fingers of one hand those white men who have been into this country. Our late Governor, Sir Hamilton Goold-Adams, made a trip through parts of this country, I believe, after the close of the Matabele rebellion. A German, Captain Streitwolf, went once through here from German South-West many years ago, and my two friends, Evellyn West and Ben Johnson, also knew a good deal about the district. Another friend, Sinclair, had, previous to the war, hunted elephants here, but he, poor fellow, was killed by a lioness near the Quito River in 1915.

Let us to-night start from Buluwayo, the capital of Matabeleland, where originally the Zulu king Lobengula had his head kraal and held his court. Buluwayo means "the place of killing," significant in itself of the fierce and bloody method by which the Matabele king controlled his brave, war-like, and savage people. As racial movements are so closely interwoven with geographical history, perhaps I may be excused if we pause here in our trip to give a little outline of the history of the Matabele race itself. The Zulu race probably emerged with other Bantu tribes somewhere from Central Africa. Travelling south, they seemed to have dropped a wing of their tribe in what was till lately German East Africa. For the Wangoni, in south-west of what is now Tanganyika colony, are obviously closely related to the Zulus of the south,

* Abridgment of an Address to the Royal Geographical Society of Australasia (Queensland), 6th October, 1924.

and I believe anyone who can speak Zulu can understand the Wangoni also. These Wangoni gave the Germans a good deal of trouble some years ago, and were not suppressed without some difficulty. They made excellent German askaris, and a number of the German companies used by them in East Africa during the last war were recruited from these Wagoni. Still travelling south, the Zulus apparently came to rest in the north-east of what is now Natal. Here, under their famous king, Chaka, the black Napoleon of South Africa as he has been called, the Zulus, from a comparatively small and insignificant tribe, terrorised a great part of South Africa. The king's raiding parties, known as his impis, were sent far and wide in every direction on errands of murder and pillage. The impis were not allowed to return unsuccessful. The punishment of failure was death for the leader and probably many others of any party who came back in disgrace. There was thus good reason for the Zulu motto, "If we go forward we die; if we go back we die. Better go forward and die." One great Zulu induna named Mosiliketsi (more properly Umziligazi) had been sent with a large impi of about 4,000 men, but not meeting with success and dreading to face his angry king, decided as a last resource, rather than to return, to try to with his warriors force his way into the unknown north, and thus travelling beyond the reach of his king's arm, carve out for himself a new kingdom. Travelling north-west, Mosiliketsi fell in with parties of the pioneer trek Boers, then working up north from the Orange River. The Boers, armed with firearms and mounted on ponies, and experienced native fighters, handled the savages severely, and drove them across the Limpopo. Mosiliketsi, leaving the white men behind him, went up the Tableland of what is now Matabeleland, and there destroying or enslaving the local natives, a race much inferior to his Zulus, founded the Matabele nation. The old king's grave is also in the Matoppos, a not-unworthy neighbour of Cecil Rhodes himself. Later on, Lobengula, his son, unable to restrain his young Matabele from falling foul of the chartered company, was defeated in 1893, and his country, now part of Rhodesia, taken over by the British.

Last trip at Buluwayo I picked up my two personal boys, Amwali and Gerea, two Wachewa from north-east Rhodesia. These two excellent boys, loyal and plucky, and speaking Swahili, stuck with me right through.

Twice during the trip I had them after wounded lions in rather bad country, where they seemed thoroughly to enjoy the excitement, which I am afraid can hardly be said of their master. Amwali

and Gerea were really most intelligent natives. They would have made good askaris, and when you have boys like this for seven or eight months you really sometimes wonder if there is any limit to the possibility of negro progress and advance. Yet when during the trip, once hard pressed for meat for the camp, I had shot a giraffe, a beastly thing to have to do, though they are not by any means rare in that area, neither Amwali nor Gerea would eat the meat. When astonished that any native under any circumstances should refuse meat, they told me, "Master, we are frightened. We, too, *might come out in spots.*" The giraffe to them was a new animal. From Buluwayo we go by train to Livingstone, called, of course, after the famous missionary who first discovered the falls in 1855. What a sight and what a glorious thought to have been the first white man to gaze on the great stream of the Zambesi, rushing over that dreadful fall of nearly 400 feet into the boiling chasm below! No other sight in nature has ever so stupefied me with wonder and awe at the Creator's majestic power.

I might mention, whilst speaking of David Livingstone, that a Mr. Moffatt, grandson of the almost equally famous pioneer missionary of that name, has been made Minister for Agriculture in the first Rhodesian Dominion Parliament: a very nice and pleasing incident.

Leaving the railway at Livingstone, our path now lies up the right bank of the Zambesi, and once above the rapids one finds the Zambesi itself a great native waterway up and down which the Barotsi paddle their canoes. The natives, sitting in the canoes, chant the little boatman's song, "Zambesi, Zambesi, ah where do you go, Where do you come from and where do you go? Nobody knows, nobody knows."

Though still 1,200 miles from its mouth, the great river must be a mile wide, and the natives wonder as to where the great stream begins and ends can be understood.

About seven days' travel takes us with our safari to Sesheke, the second capital of the Barotsi. In the old days before the white man, condemned people were executed here by being tied up and thrown into the river to the crocodiles, which are very plentiful, especially in the back waters of the big river. It is said that there may still be an odd monster in the river near Sesheke who had partaken of this human diet and is not now above boldly taking an unwary native out of his canoe. The Barotsi, or as they call themselves, the Marosie, have also a peculiar

and fascinating history. A party of Basutos many years ago came up and conquered the Makololo, the owners of the Barotsi valley. The Basuto rulers proclaimed that five years only would be allowed for their Makololo subjects to learn to speak Sisuto (Basuto), and that after five years no one would be heard or allowed to plead in their native courts except in the Sisuto language. This rather cunning and not unstatesmanlike move soon made Sisuto the only language of the whole Barotsi kingdom, and though afterwards the Basuto aristocracy was deposed and to a great extent wiped out, yet the Basuto language remains in general use. At Sesheke we now pick up twenty to thirty Barotsi porters and start once more up the right bank of the river. The big road running up to the Barotsi capital, Lialui, 400 miles away, branches off and is left to our right. It was on this road that there was an instance of a peculiarly bold and dangerous man-eater. There was a Boer transport rider, John Horn, who used to carry goods and stores between Sesheke and Lialui. Like most of his countrymen, this Dutchman was an excellent shot and experienced hunter. A friend of mine, a native Commissioner, Mr. Venning, who knew John Horn well, told me that a hunch (as the Americans say) suddenly came over the Boer that the next lion he met was going to kill him. He asked Mr. Venning where he could buy a good heavy-bore rifle, for though he had already shot several lions, this peculiar superstitution had now possessed him that the next one would cause his death. Whether he got the desired rifle or not I do not know, but shortly after, one morning, when near the Ngwezi River and just about to outspan his oxen for the day's halt, he noticed some antelope a little way off the road. Telling his boys to finish outspanning the oxen, Horn walked away to try and shoot a buck for his camp. As a matter of fact he did actually shoot one or more of the buck and his natives, hearing the shots, hurried up unyoking the oxen and picking up their sticks, ran down, shouting and laughing towards where they had heard their master shoot, like all negroes in great glee and spirits at the anticipation of fresh meat. What was the surprise and horror of Horn's natives when they came suddenly on a great lion dragging the dead body of their master towards a patch of thornbush. Driven off by the natives' shouts and yells, the lion left his prey, and the boys took the body to the waggon. Another friend of mine who happened to be the first white man to see the unfortunate man's body, told me that he had evidently been stalked and seized from behind: one paw wrapped round his chest, the other across his face, he had been killed instantly with a bite through the back of the neck. This, of course, is a most

daring and exceptional act of even a man-eater. It was about here, too, that a Greek driving cattle at night with his natives was, unknown to his boys at the time, seized and eaten by a lion or lions. The boys, having missed him, halted the cattle for the rest of the night and followed back the track at daybreak. They found only the head with two staring eyeballs, the remains of what had so recently been their master.

About three days up from Sesheke we must cross the Zambesi, swimming, or rather, towing the fat little pony behind the biggest canoe; for 1,200 or 1,400 yards, if the river is high, will be too much for the little chap's swimming powers. We have next seven or eight days' travel across rather a dry and sandy belt till we hit the Quando. This river is the boundary between north-west Rhodesia and the Portuguese territory of Angola. We shall now have left all white men some days behind us. When I crossed the Quando early in June, 1923, there was still living on the Portuguese side poor Ben Johnson, with whom I had served as an intelligence scout on the Portuguese border in 1915. Johnson was a strange figure and strange personality, hardly to be found except in some out-of-the-way place in Africa. Of considerable culture, a good deal of his poetry, some of it very fine, has appeared in various English papers. I have also seen published articles of his in English periodicals. As proud as Lucifer, his was a courageous and manly personality. Touchy and quick to take or find offence, Johnson was yet all kindness where women, children, or animals were concerned. His career must have been a romantic one, serving, I believe, when still almost a boy, in the English Secret Service in a foreign colony. He was a beautiful shot with the steadiest of nerves, and just before I turned up he had shot his twenty-seventh lion, all on foot, and I believe mostly alone as far as any white companion goes. Poor Johnson, I am afraid I didn't bring him the best of presents in the copy of Adam Lindsay Gordon which I especially brought out for him.

My main hunting camp was made about eight days away from him, and we exchanged friendly notes by natives at intervals during the winter whilst I was out there. I fully intended seeing him on my way back, spending at least a day with him for a long heart-to-heart talk, but water was getting scarce as I came back through the sandvelt just before the rains, so that I had to hit the Quando nearly 30 miles below his camp. This was too far to drag the porters and load up and back. A few weeks after I had passed, Johnson became very despondent and in low spirits. In this severe fit of depression he shot his oxen and his old mule, Biddy, piled all his belongings, spare rifle and cartridges, on his

little cart and set fire to it, then taking off even his singlet he committed that, too, to the flames. Then walking to the river, he leant over that dark and crocodile-infested stream, and pressing the trigger of his favourite rifle, released a brave and manly if unhappy spirit.

Leaving the Quando behind us, and now in Angola (Portuguese West Africa), we have come, still steering westwards, into the country of the Mambokushu, though "wild and woolly," yet a friendly and sociable people. Their country is a poor one with barely sufficient rain to ensure their meagre crops of mealies, kaffir corn, and a kind of fine millet which they call "makongu."

The Mambokushu language has undoubtedly strong affinity with the Swahili of the east coast. Once when saying to my boy Gerea, "funga imbwa" (Swahili for "tie up the dog"), a raw Mambokushu alongside smilingly started to do so, explaining to me that those words were also Mambokushu. These Mambokushu have rather a pretty legend of their origin. They say that formerly they lived in quite a different and distant locality, but that their then paramount chief (probably fearing some more aggressive oncoming race) sent out some men to try and find a new and vacant territory to which he could remove his people to make new homes. After many moons his men returned, bringing with them three things. The first of these was a handful of Maboola, a beautiful sweet nutritious fruit, very plentiful through the present Mambokushu districts and on which practically all the tribe in bad seasons subsists for the early summer months before the new grain crop is ripe. The second thing brought was a skin bag of good soil, showing the country they had found was sufficiently fertile to grow the needed crops. The third was a large dried fish, showing that there was a big river (the Okavango) full of fish for the catching. On this report, so they say, the Mambokushu shifted, probably some centuries ago, to their present district. The story always reminds me of Moses' spies bringing back the bunch of grapes.

Perhaps we should describe how we travel. As light breaks, the porters, urged by Amwali, begin somewhat unwillingly to sit up round their fires. This, if the weather is at all cold, is the poor clotheless negro's "bad quarter of an hour." The pony is given his nosebag with a few handfuls of grain. Your personal boys, if you desire it, will soon have a cup of coffee ready. The porters begin to get their loads together, your own boys packing up your bedding, camp chair, etc. One always has a "Neapara" (head porter) who bosses all carriers, allocating the loads, etc. He himself carries only a nominal load, perhaps a spare rifle.

There is often much grumbling and rowing amongst the porters. One has been given something extra to carry or some little element of dispute arises; but it all means nothing, for they are really as jolly and happy as sandboys.

With any local natives or guides we start ahead; generally one of our personal boys comes with us, and the other stops with the main safari (party) of porters. One generally travels till about ten or eleven o'clock, but, of course, stages are always really governed by the water obtainable. If one does ten or twelve miles it is quite a fair thing, for we are not in any hurry. Of course, when necessary we sometimes make a much longer stage. Once you are used to it one finds travelling with porters much the nicest way of all, but it takes an Australian some time to realise it. Whatever porters you have you will invariably find they will, in the first few days, try out their masters by means of a sort of strike. There are, I think, just two ways and two complaints which they work on. One is "Bwana, our loads are too heavy," and the other is, "Master, we are dying of hunger." Once the first strike is amicably but firmly settled all will go well ever after.

My Marosie porters here, of course, did the usual "try-on," a week or so after being on the road. They could hardly complain of heavy loading, for being an Australian accustomed to horses one has never quite got used to using human beings as transport, and I know I always load the boys very lightly; also when all your porters are lightly loaded, if in case of need, you shoot a buck whilst travelling, you can generally get the meat brought along by cutting it up and giving each porter a certain amount to carry as well as his load. A burden of fresh meat is, of course, a labour of love to any native.

The Marosie therefore, all coming up and gravely sitting down with long faces, respectfully informed me through a spokesman that they were "dying of hunger." Inquiring, equally gravely, about the symptoms, the spokesman told me "a very faint and weak feeling and gnawing pains internally." Having shot a wildebeeste the evening before and purposely halted a day to dry the meat, one was somewhat astonished at their remarkable statement, especially as a search of the porters' camp by Amwali, whilst the deputation squatted in front of me, brought about 40 lb. of fresh meat to light. This somewhat damning evidence being laid in front of them, the Marosie broke into cheerful smiles, and, being waved away like naughty children, never gave the slightest trouble between then and being paid off seven months later in Sesbeke.

But to return to our journey, when we make camp after the morning's trek, after perhaps an hour or two the safari begins to turn up. Camp is formed, food is served out to the natives, and the personal boys serve their master his midday meal. In the afternoon, with a local native or two, if near a village, or with bushmen if any are with the party, the white man generally has to go out to try and shoot a buck of some sort to keep the camp in meat. If near a village some of the women will bring a little native grain or flour to trade for print or meat. The porters left in camp collect wood for the fires at night, whilst a couple of piccaninnies are given the little sickles and cut a couple of big bundles of suitable grass for the pony. If one is lucky and has shot a buck a number of porters are also sent out to carry home the freshly cut-up meat. Just at dark, perhaps a dozen natives loaded with meat return to camp in great spirits.

One has had a good bath of hot water in an oil sheet laid over a hole scraped in the sand. Grass has been cut for my bed and my blankets laid neatly on it by Amwali. The folding chair and table is ready, a piece of clean calico acting as a tablecloth. Amwali has cooked my supper, which Gerea serves. The fires are now shining brightly. All around in a rough circle parties of natives squat at each. The pony is securely tied up somewhere in the middle. The natives keep up an endless chatter, punctuated with jokes and roars of laughter. A jolly sociable fellow is the negro, especially so when your camp contains much fresh meat. But after a time even they begin to sleep, and the great African night, always clear and starlight in these parts in the winter time, envelopes our little camp. Though the night is still there is no actual silence, for night birds abound, hunting their prey with curious little notes. One may hear the sharp bark of a koodoo or the whistling sound of a reed-buck if near a river, perhaps the rasping, sawing sound made by a leopard, or even that grandest of all music, a party of lions roaring as they come down to the water close by.

Longfellow strikes a very true note in that beautiful poem where the dying American slave dreams he is back again at night in Africa:—

"At night he heard the lion roar
And the hyena scream,
And the river-horse as he crushed the reeds
Beside some hidden stream.
And it passed like a glorious roll of drums
Through the triumph of his dream."

We are now in a dry sandvelt country; all open forest or sand and really the northern part of a continuation of the great Kalahari Desert. It is *at first sight a* rather forbidding-looking country, uninteresting and monotonous in the extreme, and none too well watered. Every few miles one finds "morambis," or, as the Herero name them, "marambas," which appear to be the old filled-in beds of former creeks or watercourses. In the morambis the sand is much harder and here and there there are shallow depressions called vleys or pans, which, filled in the rainy season, may hold water, some for a few months, but an odd one right through the dry season.

Though, as I said, *at first sight* an uninteresting and miserable-looking country, when one has made a number of trips into this part of Angola one begins to find great charm in this same sandvelt. One finds many of the trees are really beautiful, that the sand even itself has many shades of colour, and where at first one hated camping on the sand of this dry forest, afterwards we never felt our camp was really nice and right unless on the sand. The sandvelt too, one finds from association with natives, especially the bushmen, has many edible nuts or fruits, some of them at a pinch satisfying enough even for a white man. Besides the vleys or pans there are dotted all through this district little native sandpits, most of them with just enough water to supply one white man's party for a day's halt—water preserved for drinking and cooking only, all washing strictly barred.

We can now expect to meet our first bushmen. Though shy and timid little people, once they hear that it is Surumatau (my native name, "the man whom the lion bit") who has arrived, they will come freely into our camp. I had told Amwali in Buluwayo that we were going to make a trip to hunt lions in a far country where the people, small and of reddish colour, spoke with clicks and made neither houses nor shambas (cultivation plots). He told me afterwards that he had hardly believed this at the time, but when we saw our first Maquengo and their encampment he said to me, "Ah! Bwana queri mtu ya poli tuu" (Ah! master, truly men of the wilds only).

The exact origin of the Maquengo bushmen would be, I fancy, hard to know, as there is evidently some higher outside influence mixed with the pure original bushmen stock, besides, of course, in many individuals obvious negroid mixtures here and there amongst the pure (*i.e.*, light-coloured and small) bushmen type

also shows up. Africa is truly a land of romance, and who can say that perhaps some little party of the Zimbabwe gold-seekers for instance may not have been cut off outside when their main posts retired or where overwhelmed, and that this little party fighting their way across finally found shelter amongst these little bushmen of the Northern Kalahari.

I believe, myself, that these little bushmen of South Africa are the remnants of what were once the original prehistoric inhabitants, not only of Africa, but of most of the world, and fancy the Esquimaux are part of this once-universal race; the pigmies of the Congo, possibly, still another remnant. The very earliest mummies of Egypt show a similar "Koranna type," and I sometimes think the wonderful cave paintings of Europe are the work of a similar little bushman race (the Grimaldis) rather than of the Neolithic hunters to whom they are so generally ascribed. There is at any rate a wonderful similarity between the bushman drawings of South Africa and the cave paintings in Europe.

Though, as I said, shy and timid of strangers, they have many fine qualities. I have never known them to steal; they are most affectionate to their women and children, and, owing to the poverty of their country generally only one or two families camp together. They make no settled permanent homes, though their different groups keep more or less to their own areas. The Maquengo never seem to wash, which may be excused as from necessity when camped at only a tiny sandpit ("ganna" as they call it). I have never had the slightest hesitation, although days away from any other white men, in handing my rifle to carry, to any young bushman that I may have picked up whilst hunting. The more I have to do with bushmen the more I like them. They have been often described as low. Extremely primitive, they certainly still are, but low in a degraded sense—NO! There are far, far lower types of humanity to be found in a great white city.

No traders have ever been into their country, for what, indeed, has the poor Maquengo to trade? Only at times a little wild, thin, dark honey, his knowledge of the local waters, and his incomparable skill in tracking game. Without winning his confidence and thus gaining the advantage of these two things from him, no hunter in these parts can meet with anything but failure. Till you have thoroughly won the bushman's confidence, and this takes more than one trip into their country, you will continually run up against that monotonous irritating motto of theirs—"Hambi Sha, Sha Hambi" (No water, water there is none)—with which they meet and counter all questions of route and direction. When, however,

you have overcome their suspicions and shyness, it is amusing to see the way a young bushman, who has guided you to an unlooked-for and unexpected pool of fresh water, will point and proudly say, "Sha Iséka, Iséka Sha" (beautiful water, lovely water). He has paid you his greatest compliment.

Living in this sandvelt, the sand itself is their newspaper upon which they read all the movements of the wild life, human and otherwise, around them. If you cut the spoor of, say, a big bull eland or giraffe, your little trackers know at once how long ago he passed, whether he was feeding slowly at leisure or had been disturbed; in fact their judgment at once guides you as to whether the buck is worth following up. Big buck, especially eland, are more shrub than grass feeders, and the green leaves dropped as they browse along give the bushmen a sure clue to the game's proximity. Bending a leaf between their fingers they can tell by the sappiness in it (varying also, of course, by the amount of sun on it) how lately the buck passed. The bushmen's eyesight is splendid, not that they can actually see more than the ordinary white man but they have the power of noticing and of close observation. When they have once shown you anything, you can see it as well as they.

YOUNG BUSHMEN. BUSHMEN TRACKERS. YOUNG MAQUENGO BUSHMAN.

These primitive little people must have a hard, and, one would think at times, an even precarious existence, and are no doubt often enough on short commons. The lion provides them with

perhaps most of their meat, and they always keep a good look-out for vultures, the sign of a lion's kill, for they never despise anything in that line, however old and putrid or mangled over. They kill a certain amount of game with their poisoned arrows, and are clever at snaring small game, birds, etc. Their forests supply them, too, with various edible roots and nuts and wild fruits, if such fare can be dignified with the latter name. They are also great honey-gatherers, and it is wonderful what trees they can cut down with their tiny little native tomahawks. Bushmen (the old men especially) have a great craving for tobacco, which they get from the Mambokushu who grow the plant. They inhale the smoke in two or tree great choking gasps through an old antelope horn, then pass the horn around to each other. One realises when one has a little encampment of bushmen with one, how little primitive man sleeps compared to his civilised brother, who, lying down, settles himself for a long unbroken night's sleep straight off. On the other hand, at almost any hour of the night you will notice some of the bush people crouching over a fire or putting sticks on it, or half lying on an elbow, awake though resting.

It is a fine plan to take some few pounds of sweets and also a lot of bright-coloured beads to make friends with the bush children. The Maquengo know now that I like them to bring their youngsters, and with the above two gifts of sweets and beads one quickly makes friends with the quaint little things, who soon get over their first shyness and awe.

The Maquengo language, full of clicks, is obviously, as its poverty shows, a very primitive one. Is there anything more interesting or pleasing than finding oneself just beginning to understand a little of a new and strange language? Intonation itself seems to make all the difference in words otherwise appearing similar; for many bushmen words seem so alike as to appear identical, till a difference in meaning is found out by actual practice and further intercourse. For instance ōō (pronounced as one word) I always thought to mean the hyena till on this last trip I found it meant "to-day," whereas hyena is really (wh)ōō, a very faint breathy whooping sound (previously undetected) preceding it. "Kwa," the roan antelope common in these districts, is with a sharper intonation also the elephant.

The bushmen's expression for "to go" is "Garé, garé," literally "tracks, tracks." A Brisbane citizen parting from a friend at the General Post Office might say, "Well, old man, I must make tracks," without, of course, any literal meaning. Not

so the Maquengo, who know that to go *is* to necessarily make the tracks that mean and convey so much to their lives. Furthermore one finds that "garé" also means "toe," and one has only to hunt for a little time with bushmen in that sandy country to see that it is the toe, say, of a galloping buck, that makes the essential feature of the track, just as it is much easier to read the top half of a printed line than the bottom.

The Maquengo girls when children seem to be betrothed to some young man who then for years makes gifts of food, skins, etc., to the girl's parents; on the girl reaching maturity she is handed over to him. Last trip I had a very intelligent middle-aged bushman with me named Dēenengi. He had been, he told me, for some time with Johnson, elephant hunting, and could speak a little Sikololo. When asking him Maquengo for various numerals, "one" was "igwe," "two" was "tsgam" (clicks on both). "Three," I asked him, holding up three fingers. He seemed puzzled; then, a light breaking over his face, "Why, that is many (teeya)" he explained; a very simple and delightful arithmetic for the youthful Maquengo scholar. The bush children's curriculum would no doubt be envied by many a white boy, consisting of lessons in tracking and snaring game, a keen eye for vultures over a lion's kill; also for "sugar bags" (Australian for bees' nests), and a knowledge of all eatables that the bush provides in the way of wild nuts, beans, and fruits. The children, too, have soon to learn to carry wood and water, their little proportion of the family loads when shifting camp.

The Maquengo are very shy and timid about leaving their own districts, and I have never seen or induced any of them to cross east of the Quando. As soon as they get near the Quando they leave you. Poor though their country is and hard and precarious their existence in it, yet it is a case, I think, of—

> " The forests with their myriad tongues shouted of liberty
> And the blast of the desert cried aloud with a voice so loud and free."

Since they will not come further with us we must say goodbye to our little copper-coloured friends and to their sand forests, recross the Quando, and nine or ten days later the Zambesi also, near Sesheke. There we are only a hundred miles or so from Livingstone and civilisation.

PRESIDENTIAL ADDRESS.*

By His Excellency the Rt. Hon. Sir Matthew Nathan, G.C.M.G., F.R.G.S.

I apologised at the Annual Meeting last year for the fact that my Presidential Address neither dealt with a specific or important geographical subject nor traced the general progress that had been made in geographical science during the year. In place of that I gave a very brief account of the extent to which the Queensland Branch of the Royal Geographical Society was accomplishing the objects of the Society as set forth in its revised constitution of 1900. I fear I am going from bad to worse, for this year, owing to my many other activities, I had regretfully to decide, after consultation with the Hon. General Secretary and Treasurer, that we should omit a Presidential Address as part of the evening's proceedings at the General Meeting and that it should be made mainly a social occasion. I have felt, however, that I ought to say, at any rate, a few words to show how we stand in relation to our position on the corresponding occasion in 1923, and especially to deal briefly with the progress made in the biggest work with which we are connected—viz., the investigation of the problems of the Great Barrier Reef. Leaving that to the last, I would state in the first instance that in the advancement of the study of commercial geography we have not done much in the course of the year. We have had Mr. Evans's address on the geographical distribution of cotton, which will in due course appear in the Journal, and we have arranged to have presently a corresponding paper on the geographical distribution of wool, from one of the best authorities in the State. It is only through our lectures and the Journal that we have advanced our general educational object and indeed, owing to the few lectures that have been given to our branches, the year in this respect has, I regret, been rather one of retrogression. The decision announced in the Annual Summary, that has been read by the Secretary, to give greater prominence in our programme to popular lectures open to the public will, I trust, lead to increased vitality in the branches and at Headquarters in 1925. As regards the special educational objects of the Society, I must again express my regret that in the matter of influencing the teaching of

* Delivered at the Annual General Meeting of the Royal Geographical Society of Australasia (Queensland), 19th November, 1924.

Geography in the schools of Queensland the Society has not been active in the past year. Under the heading of the collection and publication of historical records, it has made some progress through the Place Names Committee. We have added about 750 to the 1,500 names reported last year, of which we have some knowledge of the origin. I will take this opportunity of mentioning the work for this Committee of Miss Dorothy Denniss and Miss Edna Campbell at Headquarters, of Miss Nesta Griffiths at the Mitchell Library, Sydney, and of Miss Hendy-Pooley at the Parliamentary Library in Melbourne. Mr. C. Schindler has also given much attention to the meaning of aboriginal place-names and is extending the researches that he can make, in the short leisure that his University duties leave to him, to native vocabularies generally. As I mentioned the Society's library last year, I would now thank Mr. Hugh McIntosh and Miss Joan Robertson for the work they have put in, making accessible the considerable mass of valuable literature that it contains. This leads me to the announcement that before another Annual Meeting the headquarters of the Society will have been transferred to rooms in the Teachers' Training College in Turbot street. As far as I am able to judge, the new quarters that are to be provided at the old Trades Hall will be suitable and sufficient for our purpose. As I dealt last year at some little length with the valuable services that have been rendered by our Hon. Secretary and Treasurer through the long years of the Society's existence, I shall not refer to them again on this occasion except to say that they have been continued during the year at the expense of all Dr. Thomson's personal interests.

Coming now to the principal subject of my remarks, I would inform you that since the last Annual Meeting of the Royal Geographical Society, the Great Barrier Reef Committee, which has now members representing thirty-four scientific institutions in Australia and twenty-three other members, has held eleven well-attended meetings in Brisbane, of which nine have been regular monthly assemblies and two have been called together specially for the occasion of visits to the port of H.M.A.S. "Geranium" in order to get the advantage of consulting our members, Lieut.-Commander Bennett and Dr. Paradice of that ship. There was also a meeting held of such of the Victorian representatives as were able to attend at Government House when I visited Melbourne in March last, and we have record of another meeting of these members in July. We have also record of a meeting of the New South Wales members in Sydney on 12th November. At several of these meetings there have been financial discussions. It was

generally felt that while there should be no public appeal for funds for the work of the Committee, that work as it went on should be made more and more known to the public by lectures, not only to scientists but also to other bodies of the public. In this connection Professor Richards read a paper to the Australian Association for the Advancement of Science at their meeting on the 30th August last. He had previously, on the 10th July, lectured on more popular lines at the School of Arts here, as well as to University students on the occasion of an excursion to the Islands of the Capricorn Group early in July. Professor Goddard of our University, Professor Skeats of Melbourne University, and Mr. Charles Hedley, who accompanied that excursion, also lectured on Barrier Reef subjects, and on another occasion Mr. Hedley spoke in the matter to the new branch of this Society that had been formed by Dr. G. H. Vernon at Thursday Island. Mr. H. A. Longman of the Museum brought it before the Workers' Educational Association at the end of last year and the Amateur Fishermen's Association in the middle of this. I had the pleasure of mentioning it at the meeting of the Royal Australian Ornithologists Union at Rockhampton last month, and that Union has appointed five Queensland members, including Mr. W. B. Alexander, a member of the Great Barrier Reef Committee, to co-operate with it in studying the Reef's ornithology. I have also been privileged to speak briefly on the subject of the Reef to excellent audiences at the Railway Workshops at Ipswich, Rockhampton, and Roma Street.

A satisfactory feature with regard to the work of the Great Barrier Reef Committee has been the provision of funds by the Queensland Government, the Universities of Sydney, Melbourne, and Queensland, and by a small number of men in the three States who have the distinction of being genuinely interested in scientific research. In December last we started to collect £5,000 to serve for the work in the years 1924 to 1928 inclusive. Greatly assisted by the promise of the Queensland Government to give £ for £ up to £500 a year for five years, the task of collection was completed in June last; rather more than the minimum amount required for the five years' work has now been got together, the actual amount paid or definitely promised to date being £5,317. The funds have been duly placed in the hands of trustees, who are the Chancellor and the Professors of Biology and Geology of the University of Queensland, and the Minister for Public Instruction of this State for the time being and one representative of the donors, Mr. W. M. L'Estrange. The amount raised is, as I have said, the minimum required, only allowing the employment of one permanent officer, and so largely restricting the research to what can be done by

voluntary work and with the assistance of Government Departments and officers. We believe, however, that the public interest will be sufficiently aroused long before the end of the five-year period to assure our obtaining the comparatively large sum required for the permanent endowment of research on the reef and in the ocean that it fringes, and for thus bringing Australia belatedly into line with America and other countries in the matter of oceanographical studies.

I have referred to the engagement of a permanent officer by the Great Barrier Reef Committee; they have been fortunate in obtaining the services for three years from the 1st April, 1924, of Mr. Charles Hedley, formerly of the Australian Museum, who has probably a more intimate knowledge of the reef, and particularly of the life on it, than any other scientist of the day. From July to October the Committee also had the assistance of Mr. F. Jardine, the holder of a research scholarship from the Sydney University.

Summarising in a few words what has been done in the year by the Committee in investigation and publication, I would recall to your memory that a general account of a five-weeks visit of Professor Richards and Mr. Hedley to the Great Barrier Reef between Cairns and Thursday Island in June and July of 1923 was published in last year's "Queensland Geographical Journal." The results of the geological observations then carried out will be made known under the heading of "A Geological Reconnaissance in North Queensland," in the first volume of the Committee's Transactions that it has been settled are to be published by our Society. The visit to the Reef of a party from the Pan-Pacific Conference in September, 1923, resulted *inter alia* in a paper by Professors Marshall, Richards, and Walkom on "Recent Emergence at Holbourne Island." There had previously been received one on "The Movement of Sand Cays on the Great Barrier Reef under the influence of Atmospheric Conditions," by Lieutenant T. Taylor of H.M.S. "Fantome," which during the months of November and December, 1923, was surveying on the Reef about 20 miles from Dunk Island. In April, 1924, Mr. Hedley was engaged among other things in making observations of the coral, largely dead or moribund, in Moreton Bay, and in examining in conjunction with Mr. E. H. Rainford, an enthusiastic naturalist resident at Bowen, the site of a former reef fringing the south-west corner of Stone Island near that town. The result of this investigation is being published in a paper on "The Natural Destruction of a Coral Reef." The next publication that was decided on gives a first effect to the Committee's intention to collect records of the

sea temperatures that are recognised as having so great an influence on the growth of coral polyps and on their food supply. It is, "A Record of Sea Temperatures Observed at Willis Island during the Cyclone Seasons, November 1922 to April 1923, and December 1923 to May 1924." Between the 2nd and the 6th June occurred the visit to the Capricorn Islands by the University party to which reference has already been made. In July and August Mr. Hedley was, by the courtesy of the Naval Board and Lieut.-Commander Bennett, on H.M.A.S. "Geranium" which was then starting the survey of the Reef on the section between Townsville and Cairns. To this survey work the Great Barrier Reef Committee, and by implication this Society, can claim to have given, if not initiation, at any rate a considerable impetus. To complete the survey in a manner that will be of the greatest advantage to navigation and to the use of the inside waters as a safe refuge for ships will be a very big work. This gives all the more reason for satisfaction at its having been put in hand. I do not think I am abusing confidence when I say that I was pleased to find on the occasion of the Prime Minister's recent visit to Brisbane that he was keenly interested in it. Of course to us of the Great Barrier Reef Committee the survey will have an immense value apart from that connected with navigation. We expect to learn, from the picture of the sea bed that it will give us, much about the growth of coral reefs and, independently of the survey itself, splendid opportunities of getting on to the least accessible parts of the reef are being afforded to our investigators. On the occasion of Mr. Hedley's visit to the North to accompany the "Geranium" he made a careful study of the Townsville plain and the probable circumstances of its formation in connection with that of the reef bed. He visited the Palm Islands off Lucinda Point, had an opportunity of examining the raised beach at North Barnard Island near Mourilyan, and was at Frankland Island between Mourilyan and Cape Grafton and at Fitzroy Island off Cape Grafton near Cairns. In September, through the kindness of the Commonwealth Lighthouse Service and of Mr. I. M. Cowlishaw, District Engineer, who is a member of our Committee, Mr. Hedley visited Bramble Cay (9° 8′ S., 143° 52′ E.) accompanied by Mr. Jardine, who had previously been making physiographical observations on the raised beach of Curtis Island and on Keppel Bay near Rockhampton. The full results of these visits and observations have not yet been recorded. It may be mentioned that in the course of them there has been made a collection of corals that will probably be found to be unique in its fullness. The detailed examination and classification of them and the distribution of specimens to the various

museums of the interested States awaits Mr. Hedley's return from a three or four months visit to South Africa, opportunity for which was promised when he took up his appointment under the Committee. It may be stated here that the compilation of a "Handbook of the Corals of Queensland," in which specimens would be clearly illustrated and described so as to be recognisable by ordinary readers, has been put in hand, and that a full bibliography of the Great Barrier Reef is also being undertaken by the Committee.

It will be seen from the foregoing that during the year the investigations of the Committee have been pursued at various points in the whole length of the reef—within 14 degrees of latitude—from the tropic line to near 9° S. They have been carried out on the coast and inner islands where have been recorded fracture patterns into which the rocky shore has at one time or another been broken up; readjustments of the land to new levels consequent on large slow subsidences such as that illustrated by the Townsville plain or evidenced by the foundered region which once extended as a Cape north from Bathurst Head (14° 15′ S., 144° 13′ E.) and is now represented by the Flinders Group of islands; and more sudden elevation traced in raised beaches like those of Curtis Island (of which the N.W. corner touches the Tropic at 151° E.), Holbourne Island (19° 44′ S., 148° 22′ E.), North Barnard Island (17° 41′ S., 140° 11′ E.). It has been suggested, though we are still a long way from any proof of it, that pulsations producing alike faulting and warping with subsidence and elevation, these often meaning submergence and emergence, have come from the Carpentaria Deep, 265 miles to the E.N.E. of the Flinders Group, and that they have controlled the history of the Great Barrier Reef through the making and movement of the rock bottom on which it stands. That there have been other vastly different influences on this history, though they may have acted but temporarily, is clear from observations made on the fringing and Barrier reefs themselves, such as those that brought to light the destruction by rain of a healthy reef near Bowen and the shifting by wind of land material on a cay near Dunk Island. The manner, observed in the course of caring for the safety of the survey ship, in which pinnacles of the more solid forms of coral grow up from the bottom on the inward sides of growing reef patches is, as far as I am aware, a newly discovered feature of reef-building. We are still evidently but on the fringe of the two main questions with regard to the Great Barrier Reef of which a solution is required, viz.:—How do the conditions arise in Nature under which coral reefs grow and what is the nature of their growth and accumulation?

The work of the past year has been very largely preparation, and this has also been carried on on the oceanographical side. A list has been drawn up of harbour-masters, lighthouse keepers, and others along the reef and the neighbouring coast, to whom it is proposed to entrust, in accordance with their qualifications and the apparatus that can be supplied to them, observations on temperatures, salinity, plankton contents, turbidity, &c.—matters profoundly affecting life on the reef. It is hoped to start continuous records early in the year and also to make some real progress in the determination of mean sea levels in relation to bench marks that have been and will be set up. The principal feature of next year's programme, however, will probably be the putting down of bores to obtain a vertical section across the reef region, the idea being to gain information as to the thickness and nature of the coral mass and of the platform on which it is built. Such information was sought for by the Funafuti Expedition in 1896, but the results were inconclusive and would only partly bear on the conditions of the Great Barrier Reef. Though there is a definite theory, there is no certainty that coral beds attain a great thickness through constant growth of the living structure from the sea bed or through piling up of broken parts. These proposed inquiries as to coral growth will, of course, not exclude from next year's work the collection of information with regard to other forms of plant and animal life in the region. In this connection Professor Goddard intends establishing a small marine station in connection with the biological department of the University of Queensland, probably in the neighbourhood of the Palm Islands, 40 miles from Townsville. Next year I hope, also, it will be possible to make some progress with regard to the study of the economic value of the reef. I observed, some little time ago, that an attempt was to be made by a private Company to re-open the business in connection with turtle products which was conducted at the North-West Island of the Capricorn Group, between 1902 and 1913, by the late Captain Owens. The turtles are captured at nesting time, and while it is hoped that this enterprising company will meet with success in getting useful food products from the reef on to the Australian market, it may be necessary to make some inquiry as to the effect of the industry in reducing the numbers of the green turtles on the reef. The Company had in view eventually extending their operations to other products of the reef. As regards these other products, the Committee are making inquiries in the matter of the sources of supply of the mother-of-pearl and trochus shell to the big industry that makes use of these materials in Czecho-Slovakia. It is for consideration whether such an industry might not be started in Queensland.

Generally it will be evident that the Barrier Reef Committee have a full year in front of them, and that the Vice President and Honorary Secretary (Professor Richards), who is the real organiser and general supervisor of the Committee's work, as well as the Scientific Director (Mr. Hedley), and our other keen workers, will have their hands full. "The transactions of the Royal Geographical Society" dealing with the work on the Great Barrier Reef are to be published in June next and will, it is hoped, satisfy the members of our Society as well as those who have generously supported the movement that good work is being done in it. I hope, also, the coming year will see some publication by the other off-shoot of this Society to which I have referred—the Place Names Committee. It will be but a provisional issue that they can make, but probably it will suffice to bring to bear on the work the criticism required for its correction and continuation. I trust, also, that the coming year, by reason of the changes in method to which I have referred, will be most successful, both for the main Society and for the provincial branches. These changes are intended to increase public interest in the Society without in any way lessening its power to add to the world's treasury of scientific knowledge.

I trust that the few statements I have made this evening will show that the Society's Executive are deserving of the continued support of its members, and the Society itself of a wider appreciation by the community.

Proceedings of the Royal Geographical Society of Australasia (Queensland).

THIRTY-NINTH ANNUAL GENERAL MEETING AND CONVERSAZIONE, 19th NOVEMBER, 1924.

His Excellency Rt. Hon. Sir Matthew Nathan, G.C.M.G., F.R.G.S., President, in the chair.

The minutes of the previous monthly meeting of the Society were taken as read and duly confirmed.

The Hon. Secretary read the Report of Council, accompanied by the Financial Statement for the year.

The President then delivered the Anniversary Address (Page 76), and in conclusion moved the adoption of the Council's Report and Financial Statement. This was seconded by the Hon. General Secretary and Treasurer, and carried unanimously.

The officers and Council were then elected for the Session 1924-25, as follows:—

Patron:

His Excellency Rt. Hon. Lord Forster, G.C.M.G., Governor-General, &c.

Vice-Patron:

Rt. Hon. W. M. Hughes, K.C., &c., former Prime Minister.

President:

His Excellency Rt. Hon. Sir Matthew Nathan, G.C.M.G., F.R.G.S., &c.

Vice-Presidents:

His Grace Archbishop Duhig, D.D., &c.

Hon. W. F. Taylor, M.D., F.R.G.S.A. Hon. E. G. Theodore, M.L.A.

Hon. General Secretary and Treasurer:

J. P. Thomson, C.B.E., LL.D., Hon F.R.S.G.S. (Edin.).

Council, 1924-1925:

F. B. Ford, Esq., F.R.G.S.A. F. J. Morgan, Esq.
Hon. W. N. Gillies, M.L.A. Prof. H. C. Richards, D.Sc.
Prof. E. J. Goddard, D.Sc., B.A. L. A. Wilkinson, Esq.
A. Hertzberg, Esq.

The vote of thanks to the President for his Anniversary Address was moved by the Hon. Wm. Bertram (Speaker of the House of Parliament), seconded by Dr. J. P. Thomson, and carried by acclamation, the audience standing and giving three cheers for His Excellency.

ANNUAL SUMMARY, 1923-24.

In reviewing the activities of the Society during the Thirty-ninth Session, it is satisfactory to note that the increase of membership and extended development of its work, to which allusion was made in the previous Summary, have been fully sustained during the year now brought to a close.

The formation of a Branch at Thursday Island has increased the number of Provincial Branches to eight, and serves to extend the interests and influence of the Society to the outposts of the State in Torres Strait.

The Addresses delivered at the Headquarters of the Society in Brisbane during the Session were as follows:—

(i.) "Queensland's Artesian Basin," by Mr. B. Dunstan, Chief Government Geologist.

(ii.) "The Geographical Distribution of Cotton," Mr. G. Evans, C.I.E., M.A. (Cantab.).

(iii.) "A Patrol in New Guinea," by Mr. H. M. Saunders, F.R.G.S.

(iv.) "The Measurement of the Sun's Output of Heat," by Rev. Dr. E. F. Pigot, S.J.

(v.) "The Age of the Earth," by Mr. W. H. Bryan, M.C., M.Sc.

(vi.) "The Geography of Populations," by Sir Geo. Knibbs, C.M.G., &c.

(vii.) "Primitive Man as a Hunting Companion, including the Maquengo Bushmen and their Country in far South-East Angola, Africa," by Capt. Arnold Wienholt, D.S.O., M.C.

At the Provincial Centres in Ipswich and Warwick the President repeated his Brisbane Anniversary Address of the 30th November last year, the Rev. Dr. Pigot also repeated his address on "The Measurement of the Sun's Output of Heat" at the Toowoomba centre, and to the Mackay Branch Dr. J. P. Thomson, C.B.E., gave a lantern lecture on "The Pacific Islands."

Responding to the wish of the Great Barrier Reef Committee, the Council decided that all papers and reports on that Reef should be published in a volume of "Transactions" of the Society separate from the "Journal," as being more convenient for reference purposes, the first number being now in the Press and will be issued in due course.

The Joint Place-Names Committee have continued the work of card checking and recording during the year, with satisfactory progress, notwithstanding the difficulties of verification associated with the movement, arising chiefly from lack of reliable information, *most* of the original pioneer settlers by whom many of the names were given having passed away.

The annexed Balance-sheet, duly audited, shows a credit of £133 14s. 8d., from which, however, there should be deducted the cost of printing the last issue of the "Journal" to show clearly the actual financial position of the Society at the close of the year. The receipts include a generous donation

of £50 from Mr. W. H. Rudd, of Rockhampton (see "Queensland Geographical Journal," Vol. XXXVIII. p. 101), an old and greatly esteemed supporter of the Society, to whom the best thanks of the Council are due.

With the view of popularising the work of the Society and being desirous of complying with the general wish of members, the Council has decided to arrange a more attractive programme for the meetings at headquarters and in the provinces. In this regard one-half at least of the lectures given during the Session in Brisbane will be on popular geographical subjects, illustrated by lantern slides, at which the public may have the privilege of attending under conditions of admission on application to the Hon. General Secretary or to a member of the Society. The balance of the sessional lectures will be more of a scientific nature and suitable for publication in the "Journal."

At the provincial centres all the lectures given will be arranged on popular lines, with lantern slide pictures.

The Council recommend to the Society—

(*a*) That so much of the "Rules" be suspended as provides for the payment of an entrance fee.

(*b*) The reappointment of Major A. J Boyd as Hon Auditor, Mr H. W. Mobsby as Hon. Lanternist, and Mr. Hugh Macintosh as Hon Librarian.

STATEMENTS OF ACCOUNTS

From 1st July, 1923, to 30th June, 1924.

Dr.	£ s. d.	£ s. d.
By Funds at close of last Accounts—Balance in Commonwealth Savings Bank		125 16 6
„ Subscriptions Received	361 0 8	
„ Donation from W. H. Rudd	50 0 0	
		411 0 8
„ Interest on Savings Bank Deposit		4 16 10
		£541 14 0
Cr.		
To Expenditure as per Accounts:—		
Gas	1 2 3	
Telephone Charges	9 3 3	
General Printing	22 9 7	
		32 15 1
„ Advertising	5 1 6	
„ Cleaning	14 14 0	
„ Expenses of Meetings, Post Cards, &c. ..	41 17 6	
„ Typing and Clerical	17 6 6	
„ Part Cost of Printing Journal	68 15 0	
„ Hon. Secretary	100 0 0	
„ Hon. Secretary (Travelling Allowances in Provinces)	50 0 0	
„ General Postage	26 2 11	
		323 17 5
„ Expenses of Provincial Branches, Travelling, &c.	12 12 0	
„ Pan Pacific Science Congress Expenses ..	13 19 0	
„ Donation to Place-Names Committee	5 5 0	
„ Stationery	8 12 6	
„ Incidentals	7 19 8	
„ Petty Cash	1 10 0	
		49 18 2
		406 10 8
„ Exchanges		1 8 8
		407 19 4
„ Balance		133 14 8
		£541 14 0

J. P. THOMSON,
Hon. Secretary and Treasurer.

Examined with Vouchers, Bank Pass Book, &c., and found correct.
A. J. BOYD, Hon. Auditor.

12th July, 1924.

PROVINCIAL BRANCHES.

Bundaberg Branch.—Chairman: Mr. L. H. Maynard; Hon. Sec.: Miss May Dunn.

Gympie Branch.—Chairman: J. L. Thomas; Hon. Sec: Mr. J. E. O'Regan

Ipswich Branch.—Chairman: Mr. R. A. Kerr, M.A., B.Sc.: Hon. Sec.: Miss A. Douglas Brown.

Mackay Branch.—Chairman: Mr. A. F. Williams; Hon. Sec.: Miss. Peinger.

Maryborough Branch.—Chairman: Mr. A. Dunn; Hon. Sec.: Mr. G. Y. Harding.

Thursday Island Branch.—Chairman Mr. A. Broadbent; Hon. Sec.: Dr. G. H. Vernon, M.C.

Toowoomba Branch.—Chairman: Dr. T. A. Price; Hon. Sec.: Mr. C. G. Warrian.

Warwick Branch.—Chairman: Mr. James De Conlay; Hon. Sec.: Mr. R. D. Hunter.

THE THOMSON FOUNDATION GOLD MEDAL.

Awards.

The Thomson Foundation Gold Medal of the Royal Geographical Society of Australasia (Queensland), established in 1900 in honour of Dr. J. P. Thomson, the Founder of the Society, shall be awarded annually, or at such other times as the Council may approve, to the author of the best original contribution to Geographical Literature, provided it be of sufficient merit, approved and accepted by the Council. Special awards of the Medal may also be made from time to time to such persons as have gratuitously rendered eminent services to the Society.

The following are the names of the recipients of the Medal, the grounds of the award being noted only briefly here, but are given more fully in the "Journal," to which reference is hereafter made:—

1901—**Dr. J. P. Thomson,** for his great services to Geographical Science. *Vide* "Queensland Geographical Journal," vol. xv., pp. 133-134; vol. xvi., pp. 132-135, 141-142.

1906—**Sir Hugh M. Nelson,** for his valuable services to the Society. *Vide* "Queensland Geographical Journal," vol. xxi., p. 151.

1910—**Sir Arthur Morgan,** for valuable services rendered to the Society. *Vide* "Queensland Geographical Journal," vol. xxv., p. 144.

1917—**Dr. T. Griffith Taylor,** for "Thesis on the Settlement of Tropical Australia." *Vide* "Queensland Geographical Journal," vol. xxxii.-xxxiii., p. 1.

1902—**Major Sir Hamilton J. Goold-Adams,** for valuable services to the Society as President. *Vide* "Queensland Geographical Journal," vol. xxxiv.-xxxv., p. 69.

1921—**Hon. W. F. Taylor, M.D.,** for valuable services to the Society. *Vide* "Queensland Geographical Journal," vol. xxxvi.-xxxvii., p. 99.

DIPLOMAS OF FELLOWSHIP.

The following gentlemen have been awarded the Diploma of Fellowship under Section IV. of Clause 3, Constitution and Rules (*see page 2 of cover*):—

H.R.H. the Prince of Wales, K.G., &c.

*Major Sir Hamilton J. Goold-Adams, G.C.M.G., C.B., F.R.G.S.

Professor J. W. Gregory, D.Sc., F.R.S., Geological Department, University, Glasgow, Scotland.

*The Right Hon. Sir S. W. Griffith, G.C.M.G., M.A., &c.

Clifford H. Hay, Esq., C.M.G., M.V.O., Secretary, Premier's Department, Sydney, N.S.W.

The Right Hon. Lord Lamington, G.C.M.G., G.C.I.E., B.A., F.R.G.S., Hon. F.R.S.G.S., &c.

*The Right Hon. Sir William MacGregor, G.C.M.G., C.B., M.D., LL.D., D.Sc., Hon. F.R.S.G.S., &c.

The Right Hon. Viscount Novar of Raith, G.C.M.G., LL.D.

*J R. Atkinson, Esq., L.S., J.P.
E. C. Barton, Esq., C.E.
*Charles Battersby, Esq., J.P.
*Harry Baynes, Esq., J.P.
Major A. J. Boyd
Hon. F. T. Brentnall
*John Cameron, Esq., J.P.
J. C. Cartledge, Esq.
*R. M. Collins, Esq., J.P.
Alexr. Corrie, Esq., J.P.
*Ald. John Crase, J.P.
B. Dunstan, Esq.
E. E. Edwards, Esq., B.A.
J. T. Embley, Esq., L.S.
F. B. C. Ford, Esq., J.P.
*Robert Fraser, Esq., J.P.
L. C. Horton, Esq., J.P.
A. S. Kennedy, Esq.
*W. A. Dudley Le Souëf, Esq., C.M.Z.S., &c.
C. B. Lethem, Esq., C.E.
W. M. L'Estrange, Esq.
Hon. C. F. Marks, M.D.
R. H. Matthews, Esq., L.S., J.P., &c.
Thos. J. McMahon, Esq.
Rev. E. N. Merrington, M.A., Ph.D.
H. W. Mobsby, Esq., F.R.S.A.
*Hon. Sir Arthur Morgan, Kt., F.R.G.S., &c.
*Alexander Muir, Esq., J.P.
His Excellency Hon. J. H. P. Murray, C.M.G.
*George Phillips, Esq., C.E.
L. F. Schoenheimer, Esq., J.P.
J. A. Sorell, Esq.
A. A. Spowers, Esq., J.P., &c.
*James Stodart, Esq., M.L.A.
*T. S. Sword, Esq., J.P.
Hon. W. F. Taylor, M.D.
Capt. W. C. Thomson
A. D. Walsh, Esq., J.P.
*E. M. Waraker, Esq., J.P.
J. P. Wilson, Esq.
W. A. Wilson, Esq.
Rev. L. L. Wirt, B.D.

* Dead.

LIST OF MEMBERS.

(P) Members who have contributed papers which are published in the Society's "Journal." The numerals indicate the number of such contributions.

(PP) Past President.

A dagger (†) prefixed to a name indicates a member of the Council.

Life members are distinguished thus (*).

Should any error or omission be found in this list, it is requested that notice thereof be given to the Hon. Secretary.

Foundation Members.

P1 Allardyce, His Excellency Sir Wm. L., K.C.M.G., Govt. House, St. Johns, Newfoundland.
d Alton, R., Brisbane.
d Armour, R. L., J.P., Brisbane.
d P1 Atkinson, J. R., L.S., Ipswich.

d Bailey, T. S., Survey Department, Brisbane.
d P1 Bartley, N., Brisbane.
d Bell, W., Supreme Court, Brisbane.
d P1 Bennett, E. J., Survey Department, Brisbane.
d Brydon, J. M., J.P., Brisbane.

d Coghlan, J., Mount Eagle, Cooyar.

d Daniell, E. N., Survey Department, Brisbane.
d Davidson, W. M., Deputy Surveyor-General, Brisbane.
d Drury, E. R., C.M.G., General Manager, Q.N. Bank, Brisbane.

Ferguson, J., J.P., Brisbane.
d Foxton, Hon. J. F. G., Brisbane.
Fraser, T., L.S., Brisbane.

d Gailey, R., J.P., Brisbane.
d P9 PP Gregory, Hon. Sir A. C., K.C.M.G., M.L.C., F.R.G.S., &c., Brisbane.

d Heath, G. P., J.P., Comm. R.N., Brisbane.
Heeney, F. X., J.P., Lands Department, Brisbane.
P1 Hennessy, Capt. J. M., New Guinea.
Hogpan, R., B.A., Survey Department, Brisbane.
d P1 Hull, A. A., L.S., Survey Department, Brisbane.

d Langford, W. H., Survey Department, Brisbane.
Lavarack, Major C. W., Survey Department, Brisbane.
P1 Leonard, G. A., L.S., Yorick Club, Collins Street, Melbourne.
d Lilley, Hon. Sir Charles, Kt., Chief Justice, Brisbane.
Lloyd, W. M., J.P., Brisbane.
Luck, H. C., F.R.G.S., J.P., Commercial Travellers' Club, Elizabeth Street, Brisbane.

d Known to be dead

LIST OF MEMBERS—*continued.*

d Macpherson, Hon. P., M.L.C., Brisbane.
Marks, Hon. C. F., M.D., M.L.C., FELLOW, Wickham Terrace, Brisbane.
d McDonald, G. T., L.S., Rocklea.
d McDonnell, E., J.P., Brisbane.
d McDonnell, J., J.P., Brisbane.
d McMaster, J., M.L.A., Brisbane.
d Mein, His Honour Mr. Justice C. S., M.A., Brisbane.
P2 PP Miskin, W. H., Brisbane.
P1*Moore, T. B., F.R.S., Tas., New Norfolk, Tasmania.
d Morehead, Hon. B. D., M.L.A., Brisbane.
d P1†Muir, A., J.P., FELLOW, "Menzies," Brisbane.
d Muir, J., J.P., Brisbane.

O'Connor, T., L.S., "Duporth," Oxley, Brisbane.

d Persee, T. K., Survey Department, Brisbane.

Raff, H., L.S., Brisbane.
P1 Romilly, Hon. H. H., Port Moresby, New Guinea.
Russell, H. H. A., Immigration Department, Brisbane.
d Ryan, R. A., J.P., Brisbane.

d Stanley, F. D. G., F.R.S.B.A., Brisbane.
d P1 PP Stodart, J., FELLOW, Market Street, Brisbane.

d Thomson, John, M.B., &c., Brisbane.
P41 PP*Thomson, J. P., C.B.E., LL.D., Hon. F.R.S.G.S., &c., Hon. Sec. and Treasurer, Brisbane.
Trower, H., Survey Department, Brisbane.
d Tully, W. A., B.A., F.R.G.S., Surveyor-General, Brisbane.

Viner, A. J., Brisbane.

d P1 PP Waugh, J. N., M.D., Brisbane.
d Williams, W., J.P., Brisbane.
d Wilson, R. W., J.P., Brisbane.
d Wilson, W. H., Brisbane.
P1 Woolnough, Rev. G., M.A., Brisbane.
d Wright, H. T., Comm. R.N., Brisbane.

Members.

Adam, C. H., Messrs. W. Adam & Sons, Maryborough.
Adams, J. L., Thursday Island, Torres Strait, Queensland.
Affleck, Thos. H., "Westhall," Freestone, Warwick, Q.
Alexander, Arthur S., Messrs. Alexander & Walker, Maryborough.
Allan and Sons, Messrs. Samuel (the Manager), Albert Street, Brisbane.
Allan, David Muir, Walker Avenue, Teneriffe, Brisbane.
Allan, Dr. R. M., M.C., Wickham Terrace, Brisbane.
Allom, C. V., c/o B.P. and Co., Sourabaya, Java.
Allom, S. R. F., F.F.I.A., F.C.P.A., 268 Edward Street, Brisbane.
Amiet, W. A., M.A., Barrister, Sydney Street, Mackay.
Anderson, Alderman J., Warwick.

d Known to be dead.

List of Members—*continued.*

Andonara, A. T., Leopard Street, Kangaroo Point, Brisbane.
Annand, His Worship Alderman J. D., Toowoomba, Q.
Appel, Hon. J. G., M.L.A., "Sea Glint," Elston, Southport, Q.
Archibald, J. E., Queen Street, Maryborough.
Armati, P. E., Sydney Street, Mackay.
Aroney, Peter, 470 George Street, Brisbane.
Ash, Rev. F. L., Albert Street Rectory, Mackay.
Ashton, E. S., Messrs. Stupart Ltd., Maryborough.
*Austen, L., Daru, W.D., Papua.
Austin, Rev. A. H., M.A., Ipswich.
Avenell, Ald. A. E., Stationer, Bourbong Street, Bundaberg.

Bain, J., Exhibition Grounds, Bowen Hills, Brisbane.
Bardsley, G. H., "Hughenden," Logan Road, Coorparoo, Brisbane.
Bardwell, J. H., "Tranend," Cracknell Road, Annerley.
Barker, B. J., High School, Mackay.
Barker, Miss E. J., B.A., Girls' Central School, Maryborough, Q.
Barker, T. J., "Queensland Times" Office, Ipswich.
Barnes, G. P., M.L.A., Palmerin Street, Warwick.
Barnes, J. H. S., Canning Downs, Warwick.
Barnes, Hon. W. H., M.L.A., J.P., Milsom Street, Coorparoo, Brisbane.
*Barrett, Mrs. Walter, Eagle Junction, Brisbane.
*Beattie, Miss E. J., Girls' State School, Toowoomba, Q.
Beckenham, C. H., Aust. Bank of Commerce, Mackay.
Beebe, J., Works Department, Brisbane.
Behan, Thos., Garfield Station, Jericho, Queensland.
Beirne, Hon. T. C., Brunswick Street, Valley, Brisbane.
Bell, E. T., M.L.A., Coochin Coochin, Queensland.
Bell, L. C., The Armidale School, Armidale, N.S.W.
Bertram, Hon. W., M.L.A., Speaker, Parliament House, Brisbane.
Biggs, J. E., Perkins and Co., Mary Street, Brisbane.
Black, Archie L., Victoria Street, Mackay.
Black, Fred, senr., Alfred Street, Mackay.
Black, J. D., 66-68 Queen Street, Brisbane.
Booker, C. J., "Lumeah," Graceville.
Booth, O. I., Messrs. Gobbett and Booth, Ruthven Street, Toowoomba.
Borcham, Col. J. F., "Gandor," Maryborough Road, Bundaberg.
Borton, Mark W., Toowoomba, Queensland.
Bott, Miss Nan E., "Walmer," Brunswick Street, New Farm, Brisbane.
Bottomley, Jas. Parker, Ipswich.
Bourne, Fred., Victoria Street, Mackay.
P2 Boyd, Major A. J., Fellow, Hon. Auditor, Brisbane Road, Indooroopilly, Queensland.
Brady, Miss Rene, Bundaberg.
P1 P1 Brentnall, Hon. F. T., Fellow, "Eastleigh," Coorparoo, Brisbane.
Briggs, W. W. V., M.A., Scots College, Warwick.
Broadbent, A., Thursday Island, Torres Strait.
Brown, H. E., Ruthven Street, Toowoomba.
Brown, Miss A. Douglas, Local Hon. Sec., "Oakdale," Brisbane Street, Ipswich.

LIST OF MEMBERS—*continued.*

Brown, Miss M., B.A., Principal, Church of England Girls' School, Warwick.
Brown, E. S., "Dawnie," Range, Toowoomba.
Brown, Mrs., Central Girls' School, Warwick.
Brown, Mrs. E. S., "Dawnie," Range, Toowoomba.
Brown, Dr. E. E., Brisbane Street, Ipswich.
Brown, J. Leonard, J.P., "Woggonora," Cunnamulla, Q.
P1 Bryan, W. H., M.C., M.Sc., Queensland University, Brisbane.
Burbidge, W. E., Assayer, Gympie.
Burstow, Alderman T. S., Box 16, G.P.O., Toowoomba.
Buss, G. A., Planter, Bourbong Street, Bundaberg.
Byrne, Rt. Rev. Monsignor, V.G., P.P., St. Mary's, Ipswich, Q.

Calvert, Thomas, J.P., Box 67, Proserpine, Q.
Cameron, Colin, Foundry, Victoria Street, Mackay.
Cameron, Dr. J. A., B.A., M.B., East Street, Ipswich.
*Campbell, A., J.P., Glengyle Station, Birdsville, Queensland.
Campbell, G. P., Messrs. Jas. Campbell and Sons, Ltd., Creek Street, Brisbane.
Campbell, Rev. R. S., The Rectory, Albert Street, Mackay.
Campbell, Victor F. J., Messrs. Jas. Campbell and Son, Ltd., Creek Street, Brisbane.
Cannon, D., "Como," Yeronga, near Brisbane.
Carey, J., Rankin and Carey, Merchant, Gympie.
Cartledge, John Colenso, FELLOW, 246 Umbila Road, Durban, Natal, S. Africa.
Chenoweth, Dr. Ern., District Hospital, Mackay.
Chippindall, A. H., Bundaberg, Queensland.
Christsen, H. T., Merchant, Bourbong Street, Bundaberg.
Clark, Robert, Central Mill, Pleystowe, Mackay.
Clarke, G. H., J.P., Thursday Island, Torres Strait.
*Collins, Mrs. R. M., "Tamrookum," Beaudesert, Queensland.
Colman, G. S., Q.M.E. Co., Mary Street, Brisbane.
Colwell, Rev. James, F.R. Hist. S., 754 Darling Street, Rozelle, Sydney, N.S.W.
*Comino, T. S., Upper Kennedy Terrace, Paddington, Brisbane.
Connolly, Dr. T. P., Russell Street, Toowoomba.
Conlay, James De, Local Chairman, Dragon Street, Warwick.
Corlass, E. J., c/o Pumping Station, Mount Crosby, *viâ* Ipswich.
Cornwell, E. M., Victoria Street (Red Arcade), Mackay.
Corran, A., Thursday Island, Torres Strait, Queensland.
*Corrie, Alex., J.P., FELLOW, Parbury House, Eagle Street, Brisbane.
Corser, E. S., Messrs. Corser and Co., Ltd., Maryborough.
Costello, Major E., M.L.A., Parliament House, Brisbane.
Costin, T. J. F., Ph.C., M.P.S., Mewing's Block, Ipswich Road, South Brisbane.
Cramond, D., Ruthven Street, Toowoomba.
Cranley, J. P., Produce Merchant, Turbot Street, Brisbane.
Crawford, J. J. R., Sub-Collector Customs, Thursday Island, Torres Strait.
Cribb, H. S., Messrs. Cribb & Foote, Ipswich.
Croker, James, Barry House, Victoria Street, Mackay.

LIST OF MEMBERS—*continued.*

*Crorkan, T., J.P., ————
Crowther, A. J., General Manager, Railway Department, Townsville.
Crowther, S., J.P., Brighton Road, South Brisbane.
Crunkhorn, W. H., Nebo Road, Mackay.
Cullen, Mrs. M., Fitzroy Street, Warwick.
Cullinane, J. A., General Merchant, Gympie.
P1 Cumbrae-Stewart, F. W. S., D.C.L., B.A., The University of Queensland, Brisbane.
Cumming, A. J., Government Printer, Brisbane.
Curr, C. M., "Ruwenzori," Rosehill, Warwick, Q.
Curr, F. C., Oxley Street, Corinda, Q.
Curran, Mrs. Margaret, Wallace Street, Newtown, Toowoomba.
Currie, James, Palace Hotel, Bundaberg.

Davenay, M. B., Palmerin Street, Warwick.
Davie, Charles, Anvil Stores, River Street, Mackay.
Davies, A. O. C., Education Department, Thursday Island, Queensland.
Delaney, W. G., Solicitor, Nicholas Street, Ipswich.
Dent, Dr. R. C., Palmerin Street, Warwick.
Dobelle, Capt., Sydney, N.S.W.
Done, Rev. J., Mabuiag Island, Torres Strait.
Douglas, A. S., Scots College, Warwick.
Donnan, Robt. L., Albert Street, Mackay.
Dowd, Paul E., c/o Post Office, Bundaberg.
Down, Alderman G., J.P., Ward's Chambers, Queen Street, Brisbane.
Dowrie, Messrs. G. and J., Engineers, Merivale Street, South Brisbane.
Drewe, A. W., Q.M.E. Co., Mary Street, Brisbane.
Drill, R., Alfred Street, Mackay.
Duhig, Dr. J. V., Wickham Terrace, Brisbane.
†Duhig, His Grace the Most Rev. Archbishop, D.D., Vice-President, "Dara," Brisbane.
Dunn, A., Local Chairman, "Chronicle" Office, Maryborough, Q.
Dunn, Miss May, cr. Bourbong and Branyan Streets, Bundaberg.
Dunn, W. H. A., "Toowoomba Chronicle," Toowoomba.
P3 Dunstan, Benjamin, F.G.S., FELLOW, Chief Govt. Geologist, Brisbane.
Dunstan, T., M.L.A., Gympie.
Dunwoodie, J. I., Thursday Island, Torres Strait, Q.

Eaves, W. B., Accountant, Targo Street, Bundaberg.
Eden, Mrs. D. R., Box 123, P.O., Stanthorpe, Q.
Edgerton, Dr. E. C., Grosvenor House, Bundaberg.
P1 Edwards, Edward E., B.A., FELLOW, Telegraph Building, Brisbane.
Effey, William, J.P., Central Buildings, Edward Street, Brisbane.
Egan, Dr. John, M.B., Palmerin Street, Warwick.
Eizenberg, H., Palmerin Street, Warwick.
Ekelund, T., Daly Street, Manly, Queensland.
Elliott, Eric, Messrs. Taylor and Elliotts Ltd., Charlotte Street, Brisbane.
Ellison, T. A., Surveyor, Survey Camp, *via* Eidsvold, Q'ld.
Evans, G., C.I.E., M.A. (Cantab.), Department of Agriculture and Stock, Brisbane.

LIST OF MEMBERS—*continued.*

Fahey, J. T., care of Railway Goods Office, Roma Street, Brisbane.
Fairfax, J. Hubert, J.P., "Marinya," Cambooya, Q.
Fairlie, James, Messrs. Fairlie and Sons, Maryborough.
Falkner, Dr. E. A., Margaret Street, Toowoomba.
Farrar, Mrs. J., Albion Street, Warwick.
Ferguson, J. A., B.A., LL.B., 167 Phillip Street, Sydney, N.S.W.
Fish, George, J.P., 46 Grey Street, South Brisbane.
Finemore, D. S. M., Dentist, Woongarra Street, Bundaberg.
FitzGerald, C. A., c/o City Electric Light Co., Boundary Street, Brisbane.
Florence, Capt., Queensland Pilot Service, Thursday Island, Torres Strait.
*Foot, J. A., J.P., "Warrinilla," Rolleston, Queensland.
P1†Ford, F. B., FELLOW, Deputy Surveyor-General, Brisbane.
Ford, R. B., Bowen Hills, Brisbane.
Forster, His Excellency Rt. Hon. Lord, G.C.M.G., Patron, Federal Government House, Melbourne, Victoria.
Forsyth, James, "Braelands," South Toowong, Brisbane.
Foster, A. T., Norman Crescent, Norman Park, East Brisbane.
Frankel, Philip, J.P., "Zonoma," Mark Street, New Farm, Brisbane.
Fraser, J. A., C.E., Main Roads Board, Brisbane.
Fraser, Captain C. Sankey, Edward Street, Brisbane.
Fraser, Dr. W. A., M.B., B.S., Boonah.
Freeleagus, Christy, Consul for Greece, Freeleagus Chambers, Edward Street, Brisbane.
Frith, Mrs. J. O., "Rodway," Range, Toowoomba.

Gallagher, Dr. M. J., Albert Street, Mackay.
Gallagher, Mrs., Albert Street, Mackay.
Galletly, A. M. M., Alfred Street, East Mackay.
Garde, Dr. Lee, John Street, Maryborough.
Garland, S., Wholesale and Retail Merchant, Kent Street, Maryborough.
Garrick, T. A., Manager Olympic Pictures, Bundaberg.
Gataker, M. L., Messrs. Gataker and Sons, Maryborough.
Gaukrodger, D. W., "Montpelier," Wickham Terrace, Brisbane.
*Gibson, D. W., Authorised Surveyor, c/o Survey Office, Brisbane.
Gibson, W. G., Bingera, Bundaberg.
Gielis, Walter, Australian Steamships, Mackay.
Gilchrist, E. F., B.A., M.C.E., City Engineer, Brisbane.
†Gillies, Hon. W. N., M.L.A., St. Osyth Street, Toowong, Brisbane.
Gillies, R. G., J.P., City Printing Works, Elizabeth Street, Brisbane.
Girdis, John, Canberra Café, Queen Street, Brisbane.
Glissan, A. H. "Taabinga," Jellicoe Street, Toowoomba.
Glissan, C. E., "Taabinga," Jellicoe Street, Toowoomba.
Glover, Rev. W. P., Warwick.
P1†Goddard, Professor E. J., Queensland University, Brisbane.
Godsall, Mrs. A. R., Ruthven Street, Toowoomba.
Goodman, George, Alfred Street, Charleville, Q.
Gooley, W. V., Perkins and Co., Mary Street, Brisbane.
Gordon, C. G., North Street, Maryborough.
Gorringe, J. A., Authorised Surveyor, Kempton, Tasmania.

List of Members—*continued.*

Graham, Mrs. Thos., Victoria Downs, *viâ* Katherine, Northern Territory.
Grabham, C. L., 55 Point Nepean Road, Elsternwick, Melbourne, Victoria.
Grace, R. A., Thursday Island, Torres Strait, Queensland.
Graham, Wm. E., Campbell Street, East Toowoomba.
Greene, Miss Alice J. Alison, Principal, Moreton Bay Girls' High School, Wynnum.
Greenaway, Mrs., Wantley Street, Warwick.
Greenham, Dr. Eleanor Constance, Edward Street, Brisbane.
Greensill, E. H. R., C.E., Authorised Surveyor, Box 719 G.P.O., Brisbane.
Grey, Mrs. J. R., F.L.S., Apuu, Moorea Island, *viâ* Papeete, Tahiti.
Griffin, William Charles, J.P., Somerset Farm, Gordon Vale, near Cairns, Q.
Griffith, A. A., Curzon Street, Toowoomba.
Griffiths, F. A., York Street, Ipswich.
P1 Groom, Hon. Sir L. E., K.C.M.G., M.A., LL.M., M.P., "Unara," Albert Street, Toowoomba.
Groom and Sons, W. H., Margaret Street, Toowoomba.
Gruter, O. J., Dentist, Barolin Street, Bundaberg.
Gunn, Donald, "Boolarwell," Talwood, Q.

Hale, E. S., Merchant, Maryborough Road, Bundaberg.
Hall, J. S., F.A.H.S., Goondiwindi, Queensland.
Hall, T. R., Architect, Kodak Building, Queen Street, Brisbane.
Hall, Thomas, Annerley Road, South Brisbane.
Hall, Thos., East Warwick.
Haly, Frank, Commercial Banking Co. of Sydney, Bundaberg, Q.
Hamilton, R. C., B.A., Principal, Technical College, Warwick.
Hanger, T., Principal High School, Gympie.
Hannaford, S., J.P., Palace Hotel, Warwick, Queensland.
Hansen, W. H., care of Hansen and Dubois, Victoria Street, Mackay.
Harbord, H. H., J.P., Maytown, Queensland.
Harding, G. Y., Local Hon. Sec., Licensed Victuallers' Association, Kent Street, Maryborough.
Harmon, D. C., Badu Island, *viâ* Thursday Island, Torres Strait, Q'ld.
Hart, Dr. B. L., East Street, Ipswich.
*Hart, J. H., "Culterfel," Manly, Queensland.
Hart, F. H., Messrs. Gibbs, Bright, and Co., Eagle Street, Brisbane.
Harwood, S. J., North School, Taylor Street, Toowoomba.
Hayes, The Rev. Leo, Kilcoy.
Hedley, Charles, F.L.S., c/o University of Queensland, Brisbane.
Heiner, H. H., B.A., Solicitor, Town Hall, Ipswich.
Henderson, G., J.P., "Elmbank," Laidlaw Parade, East Brisbane.
Herbert, Ald. J. A., Authorised Surveyor, Stuart Street, Toowoomba.
Herbertson, Frank, Cane Planter, Windermere, Bundaberg.
†Hertzberg, A., Messrs. A. M. Hertzberg and Co., Charlotte Street, Brisbane.
Hertzberg, Marcus, B.A., LL.B., Messrs. A. M. Hertzberg and Co., Charlotte Street, Brisbane.

LIST OF MEMBERS—*continued.*

Hetherington, Alderman J. W., J.P., Main Street, Kangaroo Point, Brisbane.
Hill, J. V., Town Clerk, Goondiwindi, Queensland.
Hill, L. C., Authorised Surveyor, Shire Street, Coorparoo.
*Hill, Mrs. Lumley, Belle Vue House, Bellevue, Q.
Hillcoat, Reginald E. R., J.P., "Teneriffe House," Teneriffe, Brisbane.
Hillman, J., Victoria Street, Mackay.
*Hodel, F. C., J.P., Cairns, Queensland.
Hodges, A. G., Head Teacher, East End State School, Bundaberg.
Hogarth, R. C., "Clio," Taylor Street, Toowoomba.
*Holt, W. H., F.R.C.I., "Glanwyne," Manly Point, Manly, N.S.W.
Horn, Dr. Alex., "Ravenscourt," Herries Street, Toowoomba.
Horn, Dr. David, B.A., M.B., Ch.B., Ruthven Street, Toowoomba.
Horsburgh, Andrew M., General Merchant, Maryborough.
P1*Horton, Leonard Cecil, J.P., FELLOW, "The Gunyah," Johnstone River, Q.
Hughes, C. H., Chemist, Maryborough.
Humphreys, T. C., Surveyor, Perry Street, Bundaberg.
Hunter, R. D., Local Hon. Sec., Boys' State School, Warwick.
Hurworth, Dr. C. W., M.A.C.D. (Mel.), D.M.D. (Harvard), Toowoomba, Queensland.
Huxham, The Hon. J., Agent-General for Queensland, London.
*Hyne, H. J., Maryborough, Queensland.

Illingworth, W. E., Messrs. A. M. Hertzberg and Co., Charlotte Street, Brisbane.
Innis, Mrs. A., "The Ochils," Sarina, North Coast Line.
Irving, J. Washington, M.R.C.V.S.L., Ann Street, Brisbane.
Irving, W. Edmund, "Lorina," Kirkland Avenue, Coorparoo, Brisbane.
Irwin, Wm., "Daily News" Office, Warwick.

Jackson, Thos. D., "Creagh," Chermside Street, Teneriffe, Brisbane.
James, W., Q.N. Bank, Wood Street, Mackay.
P2 Jensen, Dr. H. I., Treasury Chambers, George Street, Brisbane.
Jensen, Thor. H., Authorised Surveyor, Treasury Chambers, George Street, Brisbane.
Johnston, Robert Henderson, F.V.C.M., F.I.G.C.M., Nicholas Street, Ipswich, Q.
Jones, Arthur, senr., J.P., Bondoola, *viâ* Rockhampton, Queensland.
Jones, Hon. T. L., Messrs. Foggitt and Jones, Turbot Street, Brisbane.
Jordan, Rev. Father M., Presbytery, Nundah, Q.
Joyce, J., Helidon Spa Water Co., Skew Street, Brisbane.
Joyce, R., 228 Elizabeth Street, Brisbane.
Jubb, E. St. V., Ruthven Street, Toowoomba.
Just, John Stephens, City Electric Light Co., Boundary Street, Brisbane.

Kemp, Charles, "Hadleigh," Indooroopilly, Q'ld.
Kempster, Leonard, Farrington Hill, Alderley, Brisbane.
*Kennedy, A., Chesley Street, Auchenflower, Brisbane.

List of Members—*continued.*

Kennedy, A. S., Fellow, Kingsholme, Fortitude Valley, Brisbane.
Kerr, R. A., M.A., B.Sc., Principal, Boys' Grammar School and Local Chairman, Ipswich.
Kidd, Rev. Walter, Gregory Street, Mackay.
Kidner, J. J., National Bank of Australasia, Warwick, Q.
Kingsford, F. J., Town Clerk, Warwick.
Kirby, Miss E., Mount Gordon School, near Warwick.
Kirkaldy, John, J.P., Lorraine, Cloncurry, N.Q.
Kirke, The Rev. G. K., St. Stephen's Church, Ipswich.
Krone, B. H., Principal, High School, Bundaberg.

Lade, F. W. H., 29 Sackville Street, Kew, Victoria.
Lamberton, H. F., care of W. H. Pantons Ltd., Mackay.
Lane, John, Principal, Rangeville School, Toowoomba.
Lather, John, Wantley Street, Warwick.
Lather, Miss J. E. L., Girls' State School, Mackay.
Lawrance, Miss G. C., B.A., Principal, Glennie School, Toowoomba.
Leahy, Hon. P. J., 293 Queen Street, Brisbane.
Lenox-Conyngham, Sir Gerald P., Kt., M.A., F.R.S., Trinity College, Cambridge, England.
Leonard, T. J., Victoria Street, Mackay.
L'Estrange, W. M., M.I.E.E., Fellow, G.P.O. Box 546, Brisbane.
*Lewis, A. A., J.P., ————
Londy Bros., Messrs., Brisbane Street, Ipswich.
Long, H., Bundaberg.
Longman, H. A., Director, The Museum, Brisbane.
Loose, The Rev. Thomas, Ascog Terrace, Toowong, Queensland.
Lord Bishop of Carpentaria, Thursday Island, Torres Strait.
Lundager, Miss M. C., Girls' State School, Mackay.

Macansh, Roland, c/o Gas Co., Warwick.
Macdonald, Hamilton, and Co. (The Manager), Mary Street, Brisbane.
Macfarlane, Mrs. C. A., "Nyota," Lawnton, Queensland.
Macintosh, Hugh, Hon. Librarian, Dornoch Terrace, South Brisbane.
Macintosh, T. B., J.P., Dornoch Terrace, South Brisbane.
Mackness, Miss C., B.A., Principal, Presbyterian Girls' College, Warwick.
Macleod, J., J. Macleod and Son, Jewellers, Bourbong Street, Bundaberg.
Macrossan, H. D., B.A., Barrister, Lutwyche Chambers, Adelaide Street, Brisbane.
Manning, W. J., "Daily Mercury," Mackay.
Marks, E. O., M.D., B.A., B.E., Wickham Terrace, Brisbane.
Maromattes, John, "Helios" Café, Roma Street, Brisbane.
Marsh, Alderman E. G., Goondiwindi, Queensland.
Massey, The Rev. C. H., St. Mark's, Warwick.
Mayers, G. R., c/o Bank of Queensland, Melbourne, Victoria.
Maynard, L. H., Local Chairman, George Street, Bundaberg.
McArthur, Robert, District Engineer's Office, Maryborough, Q.
McConachie, J., Deputy Postmaster-General, Brisbane.
McCracken, S., Royal Hotel, Bundaberg.

LIST OF MEMBERS—*continued.*

*McDonald-Terry, A. J., J.P., ————
McDonnell, Dr. Aeneas J., Margaret Street, Toowoomba.
McDonnell, Mrs. Aeneas J., Margaret Street, Toowoomba.
McFarlane, Rev. H. W., Darnley Island, Torres Strait.
McGrath, W. J., "Truth" Building, Queen Street, Brisbane.
McGregor, W., Pring Street, Ipswich.
McIntyre, D., "Strathmore," Toombeah, Queensland.
McKenzie, Dr. A. D., Russell Street, Toowoomba.
McKenzie, John A., Manager, Messrs. Robert Reid and Co., Limited, 144-146 Edward Street, Brisbane.
McKeon, J., Head Teacher, Central State School, Bundaberg.
McLean, R. W., Railway Street, Toowoomba.
McLelland, Dr. Hugh, Maryborough.
McLeod, J. J. W., "Terranora," Windermere Road, Hamilton, Brisbane.
P1 McMahon, Thos. J., FELLOW, c/o V. Yabsley, Esq., Bank of Australasia, Martin Place, Sydney, N.S.W.
McMaster, Hugh, "Devoncourt," Langside Road, Hamilton, Brisbane.
McNulty, J., Thursday Island, Torres Strait, Queensland.
McWilliam, T. M., Mowbray Terrace, East Brisbane.
Merchant, E., Targo Street, Bundaberg.
Meyer, F. E., M.A., Principal, Boys' Grammar School, Maryborough.
Millard, W. A., Technical College, Warwick.
Minnis, J. C., Chemist, Brisbane Street, Ipswich.
Mobsby, H. W., F.R.S.A., FELLOW, Hon. Lanternist, Department of Agriculture and Stock, William Street, Brisbane.
Moffat, W., ————
Moore, Dr. J. I., Commissioner for Public Health, Brisbane (or Wynnum).
Moran, H. S. F., Dental Surgeon, A.M.P. Buildings, Brisbane.
†Morgan, F. J., Manager, National Bank of Australasia, Queen Street, Brisbane.
Morgan, Miss Edith M., Principal, Girls' Grammar School, Maryborough.
Morgan, Dr. T. H., "Milford," Wickham Terrace, Brisbane.
Morris, Dr. L., Caledonian Hill, Gympie.
Morton, T., Morton and Morton, Solicitors, Maryborough, Q.
Moss, R. D., Messrs. Dalgety and Co., Elizabeth Street, Brisbane.
Moxon, W. E., Adelaide S.S. Co., Eagle Street, Brisbane.
Muir, Dr. R. A., Dental Surgeon, Edward Street, Brisbane.
Mullard, J., care of Wallis and Co., Wood Street, Mackay.
*Munro, E., "Darloo," Albion, Brisbane.
Munro, Mrs., Sydney Street, Mackay.
Murphy, The Hon. Peter, Hamilton, Brisbane.
Murray, His Excellency Hon. J. H. P., C.M.G., FELLOW, Lieut.-Governor, Port Moresby, Papua.

P4 Nathan, His Excellency Rt. Hon. Sir Matthew, G.C.M.G., F.R.G.S., President, Government House, Brisbane.
Needham, F. H., J.P., 3 Knightsbridge, New South Head Road, Edgecliffe, Sydney, N.S.W.
Nelson, D. J., Sinclair Street, Toowoomba.

LIST OF MEMBERS—*continued.*

Nelson, W. M., Tramway Office, 51 Countess Street, Brisbane.
Nicholas, C. E., J.P., "Highlands," Samford, Queensland.
*Noble, H. G., "Instarfield," Ascot, Brisbane.
Noonan, Jas. A., Palace Hotel, Sydney Street, Mackay.
Norris, H. L., Juliette Street, Mackay.
Nutting, Capt. Gerald, Station Street, Clayfield, Brisbane.

Oakeley, The Rev. Canon W. T., St. Luke's, Toowoomba.
O'Brien, D. A., Industrial Inspector, Gympie.
O'Hara, R. E., J.P., c/o Dalgety and Co., Ltd., 65 Leadenhall Street, London, E.C. 3, England.
O'Regan, J. E., Local Hon. Sec., Mary Street, Gympie.
O'Reilly, Charles, J.P., Dornoch Terrace, South Brisbane.
O'Reilly, Reginald De Vere, M.P.S., Palmerin Street, Warwick, Q.
O'Shea, W., Head Teacher, North Bundaberg State School, Bundaberg.
Outridge, P. P., Redland Bay, Queensland.

Page, George J., Chemist, Bourbong Street, Bundaberg.
Paine, A. A., J.P., "Illalong," Brandon, *viâ* Townsville, Queensland.
Parker, W. H., Chesley Street, Auchenflower, Brisbane.
Parker, William Richard, L.D.S., Eng., Dentist, Edward Street, Brisbane.
Parkinson, F. C., Elizabeth Street, Brisbane.
Paterson, Ald. F. J., Taylor Street, Toowoomba, Q.
Patterson, Dr. Mervyn, "Moringa," East Street, Ipswich.
Paull, S. P., Queensland Novelty Company, Elizabeth Street, Brisbane.
Payne, John C., Messrs. Payne and Payne, Solicitors, Bundaberg.
Pearce, W. J., Land Agent, Gympie.
Peart, John, C.E., M.I. Mech. E. (Lon.), Engineer for Water Supply, Metropolitan Water and Sewerage Board, Brisbane.
Peinger, Miss, Local Hon. Secretary, Mackay.
Pender, M. P., Solicitor, Brisbane Street, Ipswich.
Perkins, F. H., Boys' State School, Mackay.
Perkins, Mrs. F. H., Moore Street, Mackay.
Perrett, Arthur, J.P., "Kaboonga," Kinbombi, Q.
*Perry, G. H., J.P., c/o Messrs. Perry Brothers, Ltd., Elizabeth Street, Brisbane.
Peters, W., Bundaberg, Queensland.
Phipps, J. H., King Street, East Brisbane.
Piggott, O. A., 310 Edward Street, Brisbane.
*Plant, Col. C. F., F.R.A.S., J.P., "Ferndale," Ashgrove, near Brisbane.
Pollard, A. T., "Wellhouse," Ironside, Toowong, Brisbane.
Poole, Miss C., Gibb Street, Kelvin Grove, Brisbane.
Pope, The Rev. W. G., River Terrace, Auchenflower, Brisbane.
Porter, Capt. W., Thursday Island, Torres Strait, Queensland.
Porter, Wm. George, Wood Street, Mackay.
Pound, C. J., F.R.M.S., Yeerongpilly, Brisbane.
Powell, J. V., c/o E. Rich and Co., Goondiwindi, Queensland.
Price, Dr. T. A., Local Chairman, Russell Street, Toowoomba.
Purkiss, L. D. M., New Zealand Insurance Co., Brisbane.

LIST OF MEMBERS—*continued.*

Quaid, J. D., J.P., "Ahillon," River Bank, Hill End, South Brisbane, Queensland.

Ramsey, A. G., "Times" Newspaper Office, Gympie.
Rankin, R., Rankin and Carey, Merchants, Gympie.
Raymond, Ald. A. J., J.P., 178 River Terrace, Kangaroo Point, Brisbane.
Real, His Honour Mr. Ex-Justice, Coorparoo, Brisbane.
Redmond, W. J., P.O. Box 81, Warwick.
Reed, Dr. E. B., Barolin Street, Bundaberg.
Reed, H. A., Maryborough.
Reid, P. E. A., J.P., Queensland National Bank, Ltd., Brisbane.
Rennie, Miss B. L., B.A., Glennie School, Toowoomba.
P1†Richards, Professor H. C., D.Sc., University, Brisbane.
Rillie, Miss E., Central Girls' State School, Warwick.
Roberts, A. E., Box 57, G.P.O., Ipswich.
Roberts, Spencer, M.B. Ch.M. (Syd.), Toowoomba, Queensland.
Robertson, Brig.-General J. C., C.B., C.M.G., D.S.O., Taylor Street, Toowoomba.
Robertson, Dr. (Major) W. N., C.B.E., 69 Wickham Terrace, Brisbane.
Robinson, Sir T. B., G.B.E., K.C.M.G., 7 Cambridge Gate, Regent's Park, London, N.W.
Ross-Munro, W., "Ross-Roy," Indooroopilly, near Brisbane.
Rowe, Joseph, Bundaberg, Queensland.
Rowland, J. D., East Warwick.
Rudd, William Henry, J.P., Messrs. Walter Reid and Co., Rockhampton, Q.
Russell, A. W. L., Education Department, Thursday Island, Queensland.
Russell, R., Jane Street, Manly, Queensland.
Ruthning, A. F. T., Solicitor, Lutwyche Chambers, Adelaide Street, Brisbane.
Ryan, Dr. J. P., Gympie.

Sanderson, Mrs. Eva E., Dentist, Bourbong Street, Bundaberg.
Sandison, J. T., Victoria Pottery, Ipswich Road, South Brisbane.
Sargent, John, Melbourne Street, South Brisbane.
Saunders, G. J., M.Sc., B.E., Principal, Technical College, Ipswich.
Schmidt, Dr. Egmont, Barolin Street, Bundaberg.
Schooley, B. L., C.E., International Well Boring Co., Ann Street, Brisbane.
Scott, Dr. E. W. Kerr, Brunswick Street, Brisbane.
Scott, Mrs. E. J. Moncrieffe, "Wandowalla," Warwick.
Seabrook, George Kenilworth, J.P., F.R.C.I., Albert Street, Brisbane.
Serisier, W. J., P.O. Box 3, Goondiwindi.
Sexton, R. E., C.E. (Chief Engineer), Central Railway Offices, Brisbane.
Shackel, T. W., F.S.S., Thorn Street, Kangaroo Point, Brisbane.
Shannon, J., "Endrim," Sherwood Road, Toowong, Brisbane.
Shaw, Dr. Helen, ————
Sheldon, E. G., Surveyor, Gympie.
*Shepherd, Arthur, J.P., Milray Station, Pentland, N.Q.
Short, Rev. Harold, F.R.G.S., Papua.

List of Members—*continued.*

Simpson, H. G., Education Department, Thursday Island, Queensland.
Sinclair, D. G., Postmaster, Ipswich.
Sinclair, H. J., C. Engineer, Millaquin, Bundaberg.
Sinclair, R., Ruthven Street, Toowoomba.
Skyring, Z. D. S., Pie Creek, Gympie.
Slade, W. B., J.P., c/o A. E. Slade, "Glenbar," Glengallon Road, Warwick, Q.
Smith, E. Eldridge, care of Harbour Board, Mackay.
Smith, H. F., J.P., Jeweller, Queen and George Streets, Brisbane.
Smith, John, Harringtons Ltd., 93 Queen Street, Brisbane.
Smith, Dr. J. S., Guy Street, Warwick.
P1 Sorrell, John Arnold, Fellow, Staff Surveyor, Rockleigh, Wagga Wagga, N.S.W.
Spathis, P., Brisbane Street, Ipswich.
Spence, Lockhart Horsburgh, J.P., c/o E. Rich and Co., Circular Quay, Sydney, N.S.W.
Spencer, A. R., Dental Surgeon, 12 Queen Street, Brisbane.
Spèrling, C. D., "Mayfair," Edward Street, Brisbane.
P1 PP Spowers, Allan A., Fellow, Surveyor-General, Executive Building, Brisbane.
*Steele, E., Stainburn Downs, Aramac, Queensland.
Steele, J. D., J.P., Authorised Surveyor, Southport, Queensland.
Sterne, H., C.E., Rosenthal Shire Office, Warwick.
Stewart, E. D., Australian Bank of Commerce, Ipswich.
Stirling, A. C., C.E., District Engineer, Proserpine, Q.
Stitt, James, Warmington Street, Ithaca, Brisbane.
Stone, J., Margaret Street, Toowoomba.
Stuart, W. J., Patterson Bros., Gympie.
Sullivan, A. T., Thursday Island, Torres Strait, Queensland.
Svensen, Captain O., "Norway," Galloway's Hill, Norman Park, Brisbane.
Sykes, F. B., Solicitor, Gympie.
Sym, Thos. H., General Agent and Auctioneer, Gympie.

Taylor, E., J.P., Messrs. Taylor and Elliotts, Ltd., Wholesale Chemists, Charlotte Street, Brisbane.
Taylor, Capt. R. S., Assoc. I.N.A., Lloyd's Surveyor, Eagle Street, Brisbane.
Taylor, T. McI., Manager, Moreheads, Ltd., Brisbane.
†Taylor, Hon. W. F., M.D., Fellow, &c., Vice-President, Preston House, Queen Street, Brisbane.
†Theodore, Hon. E. G., M.L.A., Vice-President, Bowen Terrace, Brisbane.
The Bodleian Library (The Librarian), University of Oxford, England.
Thomas, J. L., Local Chairman, Gympie.
Thompson, Dr. Robert, "Bunya Bunya," Wickham Terrace, Brisbane.
P5 Thomson, Capt. W. C., Fellow, "Loma Langi," Ascot, Brisbane.
Thynne, Col. Hon. A. J., Vice-Chancellor, Queensland University.
Thynne, Mrs. A. J., Highgate Hill, South Brisbane.
P1 Tolmie, Hon. James, Margaret Street, Toowoomba.
Tristram, Eric, Hope Street, South Brisbane.

LIST OF MEMBERS—*continued.*

Tritton, F., George Street, Brisbane.
Trost, A. A., Kingshill Road, Ipswich.
Tryon, Henry, Government Entomologist and Vegetable Pathologist, Department of Agriculture and Stock, Brisbane.
Turnbull, George, Thursday Island, Queensland.
Turner, S. R., Dentist, Bazaar Street, Maryborough.

*Vernon, Dr. G. H., M.C., Local Hon. Secretary, Thursday Island, Torres Strait, Queensland.
Vidgen, H. G., Thursday Island, Torres Strait, Q.
Vollbon, E. A., Bundaberg.

Waddell, W. A., J.P., "Hiawatha," Esplanade, Cairns, Queensland.
Walker, E. E., Manager, National Bank of Australasia, Gympie.
Walker, Captain T. W., Albion Street, Warwick.
*Wallace, W. A. J., Survey Office, Quala Lumpur, Federated Malay States.
Walsh, A. D., J.P., FELLOW, General Manager, Messrs. Dalgety and Co., Elizabeth Street, Brisbane.
Walsh, E. P., Chemist, Mary Street, Gympie.
Walsh, J. A., Messrs. Fitzgerald and Walsh, Queen Street, Brisbane.
Warren, C. C., 24 Wharf Street, Brisbane.
Warrian, C. G., Local Hon. Secretary, Hill Street, Toowoomba.
Watson, The Rev. A. T., The Manse, Warwick.
Watson, R. P., Limestone Street, Ipswich.
Watson, W., Chemist, Margaret Street, Toowoomba.
Watts, J., J.P., Corinda, near Brisbane.
*Weedon, H. S., C.E., L.S., Box 44, G.P.O., Sydney, N.S.W.
*Weedon, W., Victoria Private Hospital, South Brisbane.
Weir, W., Town Clerk, Sydney Street, Mackay.
Wetherell, R., Manager, Brabant and Co., Charlotte Street, Brisbane.
Whatmore, G. W., Director and Manager, Queensland Motor Agency, Adelaide Street, Brisbane.
Wheatland, Dr. F. T., M.B., B.S., Margaret Street, Toowoomba, Q.
White, W. T., Authorised Surveyor, "Wynola," Campbell Street, West Toowoomba.
Whitehead, A. E., Chemist, Nicholas Street, Ipswich.
Whitehead, R. H., Stewart Street, North Bundaberg.
*Whittingham, Hon. Arthur Herbert, "Mayfield," Hamilton, Brisbane.
Whittle, Dr. H. C., John Street, Maryborough.
P1 Wienholt, Capt. Arnold, D.S.O., M.C., Kalbar, Queensland.
†Wilkinson, L. A., Chemist, Queen and George Streets, Brisbane.
Williams, Arthur F., Local Chairman, Metropolitan Hotel, Albert Street, Mackay.
Williams, Chas., care of Q.A.T.B., Alfred Street, Mackay.
Williams, F. Stanley, Sydney Street, Mackay.
Williams, Jas. F., "Wahroonga," North Street, Mackay.
Williams, W. W., Land Commissioner, Cloncurry.
Wilson, A. W., J.P., General Agent, Charters Towers, Q.
Wilson, Dr. G., M.A., Brisbane Street, Ipswich.
Wilson, John P., J.P., FELLOW, 478 Adelaide Street, Brisbane.
Wilson, S., P.M., Thursday Island, Queensland.
Wilson, W. A., J.P., FELLOW, Flinders Parade, Sandgate.

List of Members—*continued.*

Wilson, W. B., Grafton Street, East Warwick.
Winnett, W. G., Slack's Creek, Kingston, Queensland.
Wonderley, Mrs. R. G., "Caloola," Taylor Street, Toowoomba.
Woodard, Miss A. T., c/o Mrs. Bruton, Hale Street, Red Hill, Brisbane.
Woodward, F. G., National Bank of Australasia, Ltd., Brisbane Street, Ipswich.
Wyper, W., Merchant (Managing Director, Wyper Bros.), Bundaberg.

Yearwood, Miss E. M., "La Fortune," Perrott Street, Paddington, Brisbane.

Honorary Members.

Professor Sir T. W. E. David, K.B.E., C.M.G., D.Sc., F.R.S., University, Sydney, N.S.W.
Lady Goold-Adams.
F. W. Gregory, Sydney, N.S.W.
P1 The Right Hon. Lord Lamington, G.C.M.G., G.C.I.E., B.A., F.R.G.S., Hon. F.R.S.G.S., &c., Lamington, Lanarkshire, Scotland.
Lady Morgan, "Mia Mia," Foxton Street, Indooroopilly, Brisbane.
Lady Nelson, "Gabbinbar," Toowoomba, Q.
Lady Norman, London, England.
Viscountess Novar of Raith, Kirkcaldy, Scotland.
P1 Associate-Professor T. Griffith Taylor, D.Sc., B.E., F.R.G.S. University, Sydney, N.S.W.

Honorary Corresponding Members.

Cyrus C. Adams, F.A.G.S., Editor, "Bulletin of the American Geographical Society," Broadway, at 156th Street, New York City, U.S.A.
P2 His Excellency Sir W. L. Allardyce, K.C.M.G., Government House, St. Johns, Newfoundland.
P2 Dr. J. V. Danes, Consul-General, Czecho-Slovak Republic, 40 Bayswater Road, Darlinghurst, Sydney, N.S.W.
P1 Professor Richard Elwood Dodge, Teachers' College, Columbia University, New York City, U.S.A.
Dr. Karel Domin, Asst. Professor of Botany, Bohemian University, Prague.
His Honour Dr. W. F. Frear, 303 Stangenwald Buildings, Honolulu, Hawaiian Islands.
Very Rev. D. M. Gordon, C.M.G., M.A., D.D., LL.D., Principal Emeritus, Queen's University, Kingston, Ontario, Canada.
Hon. W. T. Harris, Ph.D., LL.D., late Commissioner of Education, Washington, D.C., U.S.A.
The Hon. W. A. Holman, K.C., Ex-Premier of New South Wales, Northfield Chambers, Phillip Street, Sydney.
Sir G. R. Le Hunte, K.C.M.G., Steepleton Manor, Dorchester, Dorset, England.

LIST OF MEMBERS—*continued.*

Sir. J. Scott Keltie, LL.D., Editor "Statesman's Year Book," &c., Royal Geographical Society, Kensington Gore, London, S.W., England.

P20 R. H. Mathews, L.S., Associé étranger Soc. d'Anthrop de Paris; Corr. Memb. Anthrop. Soc., Washington; Corr. Memb. Anthrop. Soc., Vienna; Local Correspondent for Australia, Royal Anthrop. Inst. London; "Carcuron," Hassall Street, Parramatta, N.S.W.

Cathcart, William Methven, M. Inst. C.E., F.R.S.E., F.R.I.B.A., Club Arcade, Durban, South Africa.

P3 H. R. Mill, LL.D., D.Sc., F.R.S.E., F.R.G.S., F.R.S.G.S., Hill Crest, Dorman's Park, Surrey, England.

Dr. Eric Mjöberg, Director Sarawak Museum, Kuching, Sarawak, Borneo.

Rev. Dr. E. F. Pigot, S.J., Science Master and Director of the Observatory, Riverview College, Sydney, N.S.W.

Captain G. H. Pitt-Rivers, A.D.C., Federal Government House, Melbourne, Victoria.

P3 Captain J. F. Ruthven, R.N.R., F.R.G.S., Junior Carlton Club, Pall Mall, London, S.W.

Mr. J. H. Spowers, Federated Malay States.

Frederick Stubbs, F.R.G.S., Rotorua, New Zealand.

Mrs. J. P. Thomson, ————

Rt. Rev. Gerard Trower, D.D., Bishop of North Australia, Port Darwin.

A. J. CUMMING, Government Printer, Brisbane

QUEENSLAND GEOGRAPHICAL JOURNAL

(NEW SERIES).

INCLUDING THE PROCEEDINGS OF THE ROYAL GEOGRAPHICAL SOCIETY OF AUSTRALASIA (QUEENSLAND).

40th and 41st SESSIONS, 1924-26.

J. P. THOMSON, C.B.E., LL.D., HON. F.R.S.G.S., ETC., ETC., *Honorary Editor.*

The Authors of Papers are alone responsible for the opinions expressed therein.

VOLS. XL.-XLI.

PUBLISHED AT BRISBANE BY THE ROYAL GEOGRAPHICAL SOCIETY OF AUSTRALASIA (QUEENSLAND).

NOTE.—All communications should be addressed to the Hon. General Secretary, at the Rooms of the Society, Turbot Street, Brisbane.

The Royal Geographical Society of Australasia

(QUEENSLAND). Founded 1885.

40TH AND 41ST SESSIONS.

OFFICERS AND COUNCIL:

(1926-1927.)

Patron :

His Excellency Rt. Hon. LORD STONEHAVEN, G.C.M.G., D.S.O., F.R.G.S., Governor-General, etc.

Vice-Patron :

Rt. Hon. S. M. BRUCE, D.C.L., LL.D., M.C., C. de G., Prime Minister.

Hon. President :

His Excellency the Governor of Queensland for the time being.

President :

His Grace ARCHBISHOP DUHIG, D.D., F.R.G.S.A.

Vice-Presidents :

Hon. W. F. TAYLOR, M.D. F.R.G.S.A. Hon. A. J. JONES, M.L.A.,
SIR LITTLETON E. GROOM, K.C.M.G., M.P.

Hon. General Secretary and Treasurer :

J. P. THOMSON, C.B.E., LL.D., Hon. F.R.S.G.S. (Edin.), etc.

Other Members of Council :

Chairman: HON. W. F. TAYLOR, M.D.

B. DUNSTAN, Esq., F. J. MORGAN, Esq.
A. HERTZBERG, Esq. Prof. H. C. RICHARDS, D.Sc., F.R.G.S.A.
Rev. THOS. LOOSE. L. A. WILKINSON, Esq.
CAPT. ARNOLD WIENHOLT, D.S.O., M.C., F.R.G.S.A.

The Chairman and Hon. Local Secretary of each Provincial Branch (page 146) are *ex-officio* Members of Council.

Hon. Librarian :

HUGH MACINTOSH, Esq.

Bankers :

COMMONWEALTH SAVINGS BANK.

Hon. Auditor :

A. S. KENNEDY, Esq., F.R.G.S.A.

Hon. Lanternist :

H. W. MOBSBY, Esq., F.R.S.A., F.R.G.S.A.

Hon. Solicitors :

Messrs. J. F. FITZGERALD and WALSH.

Contents.

VOLS. XL.-XLI.

Anniversary Address by His Excellency Sir Matthew Nathan	1
Anniversary Address by His Excellency Lord Stonehaven ..	4
My Visit to Papua, by His Grace Archbishop Duhig	9
Wilkins' Australia and Islands Expedition, by Capt. G. H. Wilkins	17
Early Discoveries in the Northern Territory, by Right Rev. Stephen H. Davies	24
The Peoples of Palestine, by Lieut.-General Sir Henry Chauvel	35
The Significance of some Common Enemies of Health in our Midst, by Dr. H. W. Tilling	42
Discovery and History of Mackay, Queensland, by A. M. M. Galletly	54
A Lion Hunting Expedition in Central Africa, by Capt. Arnold Wienholt	62
String-Figures of North Queensland Aborigines, by G. Stanley	73
The Australian Aborigine, by T. A. Williams	93
The Establishment of Thursday Island, by S. Wilson	100
The Early Days of Pearling, by S. Wilson	107
Proceedings of the Royal Geographical Society of Australasia (Queensland)	117
Fortieth Anniversary Celebration and Conversazione, 1925 ..	124
Resolution Appreciating the Founder's Services	126
Statement of Accounts, 1924-1925	129
Forty-first Annual General Meeting	131
Annual Summary, 1924-1925	133
Statement of Accounts, 1925-1926	133
Report of Hon. General Secretary and Treasurer	139
Provincial Branches	146
The Thomson Foundation Medal Awards	146
Diplomas of Fellowship	148
Foundation Members	149
Members, List of	150
Honorary and Corresponding Members	164
Conditions and Privileges of Membership	Page 2 of Cover.
The Thomson Foundation Gold Medal, Conditions of Award and of Competition	Pages 3 and 4 of Cover.

ROYAL GEOGRAPHICAL SOCIETY,

LONDON.

CONDITIONS OF FELLOWSHIP.

The Royal Geographical Society (London), our parent Society, is desirous of increasing its fellowship with those anxious to further the promotion and diffusion of geographical knowledge by their interest and support as well as with those able to take a more active part in the work of discovery and exploration. The entrance fee of the Society is £5, annual subscription £3, and candidates have to be proposed and seconded by Fellows. Members of the Royal Geographical Society of Australasia (Queensland), desirous of becoming members of the Royal Geographical Society of London should communicate with Dr. J. P. Thomson, Honorary General Secretary of the Queensland Society.

Queensland
Geographical Journal

Nos. 26 and 27. New Series. 1926. Vols. XL.--XLI.

NOTE FOR SPEECH AT THE FORTIETH ANNIVERSARY MEETING OF THE ROYAL GEOGRAPHICAL SOCIETY OF AUSTRALASIA (QUEENSLAND), ON MONDAY, 31st AUGUST, 1925.

By His Excellency Sir Matthew Nathan, P.C., G.C.M.G., LL.D., F.R.G.S., President.

When I leave Queensland after a sojourn of rather under five years, the Queensland Branch of the Royal Geographical Society of Australasia will be the only body in this country with which I shall have been associated for somewhat longer than that time. For it was some months before my arrival at Brisbane that I accepted the Presidency of the Society so kindly offered to me by its Council, of which the Secretary may, I think, be called the directing member. I accepted it because of a great liking for and some knowledge of Geography, the result, not so much of travel (though I had travelled not inconsiderably), as of the need in the course of my professional duties to study the life of various countries and many features of land and sea in different parts of the world. I should like to think that the Presidency which, in so far as it involves the direction of the Society's affairs, is shortly to come to an end, has been beneficial. I feel, however, that in two matters which come specially within our published objects the advance that should have been made in the course of the last five years has woefully lacked. I have on previous occasions made reference to this, and it is only because I feel it would be disingenuous not to acknowledge failures when claiming successes that I mention them on this occasion. The first neglect of the Society has been as regards the country's maps. It has taken no

steps to secure the completion of the scarcely begun triangulation of Queensland or to get the natural features of the country properly represented in its cartography. The lack of maps showing hill features with any degree of correctness militates against the Society's object of securing the best education of the children in Geography, and so also does the absence of a regular system of moving picture or lantern slide instruction in the schools of the State. Having made confession of failures, I would now claim on the part of the Society credit for successes. The Barrier Reef Committee, formed at the Society's instance, is doing useful work, as everyone will recognize who is sufficiently interested in real scientific investigation to study the recently issued Transactions of this Society, in which the work up to date of the Barrier Reef Committee has been set forth. The Geographical Society also deserves part of the credit for the starting of the Committee on Queensland Place Names, whose Fourth Report is about to appear and will, I hope, be studied by all our members as well as by others likely to be able to assist in the Committee's further labours. Passing now from the work done by the Society to the question of its present condition, the Hon. Secretary can be congratulated on the success of his various attempts to start new branches and to get new members. From reports he has made to the Council from time to time it is evident, however, that unless the Council take constant and active measures to provide the branches with discussions or other activities of interest their existence will be transient and their ultimate effect on the geographical knowledge of Queensland negligible. A great responsibility thus rests on the Council to watch vigilantly these branches and to give real stimulus to their consideration of matters geographical. That they are willing to seize upon this interest if offered to them is exemplified by the keen way in which the question of a monument to Captain Cook at the place where he first landed in Queensland is being taken by the Bundaberg Branch. Of course the affairs in Brisbane are no less a matter requiring active work by the Council than those of the Branches. The Council has to provide at least eight lectures at the Society's rooms in Brisbane in the course of the year, given by men thoroughly versed in some branch of geographical science. It has to see that the library is kept up in such a manner that the valuable literature in it is made easily and conveniently accessible to students of geography. If the need for an active Council is, for the reasons I have given, great, still greater is the need for an active secretary. The President, if selected in the manner that has been the custom of late years, will not be able to give the time or the attention to the

Society's business necessary to secure its being carried out as it should be. He will have to rely in the future, as he has in the past, on the Hon. Secretary. For forty years the main conduct of the Society's business has been in the hands of Dr. Thomson, and the very existence of the Society as a live body at the end of four decades is a big tribute to Dr. Thomson's work. I am sure we all wish that the same guiding hand could direct the Society for the same number of future years. In the course of nature that is not possible. It therefore behoves the Society to give Dr. Thomson an Assistant Secretary—young, active, with some scientific taste and some literary training, who will be able to devote a considerable number of hours in the week to helping the Secretary at present and, at a time we hope will be remote, to doing himself the whole work. I feel satisfied that only if this is done will the Society continue in existence and be the monument to its founder that his devotion to it entitles him to expect. I feel also that my interest in the Society justifies me in making this appeal for securing its permanence. That interest has been real, and, though the honours the Society has conferred upon me this evening are far in excess of any that I have merited, I greatly appreciate them as testifying to this interest and to the good feeling towards me of the Council and of Dr. Thomson.

NOTES OF AN ADDRESS TO THE ROYAL GEOGRAPHICAL SOCIETY OF AUSTRALASIA (QUEENSLAND), GIVEN ON THE OCCASION OF ITS FORTY-FIRST ANNIVERSARY MEETING, 7th JULY, 1926.

By His Excellency the Right Hon. Lord Stonehaven, G.C.M.G., D.S.O., F.R.G.S., Patron and Hon. Fellow.

Lord Stonehaven said that first of all he would like to thank the Society for the welcome extended to him and to Lady Stonehaven. He appreciated very much the honour they had done him in placing him in the Chair at their 41st Anniversary Meeting.

His Excellency said that there had been no country where more had been done in exploration, during the last century, than in Australia. Much had been done, but a glance at the map showing how concentrated population was in Australia, and what wide areas remained to be investigated, indicated that there was ample scope still for the emulation of those great explorers whose names were famous not only in Australia but throughout the world. Without going back to Cook, Bass, or Flinders, if one thought of the assistance of modern times in exploration in terms of concentrated foodstuffs only, in recalling the work of such men as Sturt, Eyre, and Leichhardt, who had done splendid work under most difficult circumstances, and the benefit of whose courage and heroism we were still reaping, he could not not help thinking that the explorer's task in the years immediately ahead would be a great deal easier than that of those in the past.

Take off Your Hats.

If people only thought of what the conditions must have been when the men he had mentioned went out into the unknown, they would take off their hats to the courage of those great explorers. He thought the task was going to be easier now because of the realisation of the anticipations of Lord Novar, when he last addressed the Society. He had read that speech, which was delivered in 1920, in which Lord Novar anticipated the linking up of scientific discoveries with exploration. Since then wireless had been so developed as to make it possible to fix one's position so

far as longitude was concerned. He thought aviation was going to be called into the service of exploration. One had only to remember the great feat of a few weeks ago in the flight across the North Pole to support the belief. There were a great number of other places one would like to visit, and there were, no doubt, other countries one would like to travel over at a respectable rate of 60 miles per hour. That now was possible with the development of the aeroplane. A great work had been done in Australia with aircraft, in the photography of the Great Barrier Reef work, which was of great assistance to the naval surveyors, enabling them to do a great deal more than would otherwise have been possible.

The Main Object.

We were entitled, therefore, to look to the new developments to assist in the main object of all those present—to assist in the rapid development of this great country. Geographical work was being carried on, apart from exploration, in the course of the normal process of working holdings as big as half-a-dozen counties in the Old Country.

In the Sudan.

As an illustration of the development of the many modern aids to exploration, he told of experiences on a journey which he made from Abyssinia through the Sudan, when in the British diplomatic service in 1900. His aids were a 4-inch theodolite, a prismatic compass, a chronometer, seventeen mules, nine Abyssinians, a most expensive interpreter, who by rather obscure reasoning assessed the value of his professional assistance at £1,250,000, and a letter from the then Emperor of Abyssinia. This letter was couched in rather fearsome terms. It read:—

> "This man is going to Matamma. He is my friend. Help him in any way he requires, and, if anything happens to him on the road, look out for yourself."

Looking now at the kind of undertakings you see reported in the newspapers, it is rather curious to think of the primitive way in which the work of exploration was done so short a time ago—only twenty-six years. I hope that with the help of seaplanes, aeroplanes, and airships it will be possible for me, without any great enterprise on my part, to see a great deal more of the country than my predecessors have been able to see in the past. It was because the Royal Geographical Society of Australasia encouraged work of that kind, and by bringing people together aroused interest in the work of exploration, that he was very glad to be with them

that night. He could assure them that he would be very glad to do anything which he could to further the aims and objects of the Society.

Rev. Thos. Loose, in proposing a vote of thanks to Their Excellencies Lord and Lady Stonehaven, said:—

Your Excellencies, Ladies and Gentlemen;—

It is with pleasure that I rise on this great occasion, being appreciative of the honour conferred upon me in being asked to move this cordial vote of thanks to Your Excellency for coming to this gathering this evening and also to Your Ladyship for gracing this Annual Meeting of the Royal Geographical Society of Australasia (Queensland).

It was with pleasure and expectancy the coming of Your Excellencies was looked forward to. Our hopes have been more than realised, and all present have listened with close attention to the admirable address given by Your Excellency and feel honoured by your presiding at this Annual Meeting. The great work of collecting geographical data which you personally did in the far frontier of Abyssinia, where a mere handful of Europeans govern and protect the teeming population of the Sudan, as well as the activity displayed in furthering the interests of the parent Society in England for a long period of years, and the scientific information which has been contributed by Your Excellency, have all materially helped to spread geographical knowledge along scientific lines. You have shown that no one can achieve success by monetary considerations only. Rather it is he who makes life's purpose and aim to be the advancement of humanity and the uplift of mankind who really serves his day and generation. All achievement may be but a small part of what man strives to do, but nevertheless what has been accomplished leaves an indelible imprint. Without the least trace of flattery, for flattery is falsity, may I say that Your Excellency's effort along the pathway of Geographical Science has in some measure contributed to the welfare of mankind, while the splendid utterance which we have heard to-night has fired our ardour and increased our determination to steadily advance the interests of the Society.

Your kindly words referring to the work accomplished by the Society, largely through the active imagination and untiring labours of its popular secretary, Dr. J. P. Thomson, as well as your assurance that anything within your power to further the work of the Society will be done, is most gratifying and deeply appreciated.

We sincerely trust that your visit to this State may be very enjoyable and beneficial, and that those high aims which you have in view may be furthered by your journeying through this vast land.

I now beg formally to move—"That the sincerest thanks of this meeting be tendered to Your Excellency for presiding at the Anniversary Meeting of this Society as well as for the splendid address given, and also to Her Excellency Lady Stonehaven for her presence with us to-night."

Mr. A. Hertberg, in seconding the vote of thanks, said:—

The man in the street leans to the belief that Governors have an easy time, very little to do, and plenty of time in which to do it. My observations from the time of Governor Cairns in 1876 until the present day leads me to the very opposite conclusion. An ordinary individual is quite satisfied if within a lifetime he acquires the mastery of one subject, but of our Governors we expect that they should know, if not everything, then at any rate a great deal of every subject. This is partly their own fault for having in the past always come up to our expectations—we have now almost come to look at it as a right due to us—and it is also partly due to the driving force contained in those two words *noblesse oblige.*

Some months ago I was privileged to listen to His Excellency the Governor-General when he addressed a gathering of business people drawn from all parts of the Commonwealth, on trade matters of Imperial interest, and he then spoke as one to the manner born. Yesterday at the Mayoral Reception and to-night at this gathering Lord Stonehaven has spoken on totally different subjects, but with equal effectiveness, and it is quite evident that such a state of almost perfection is only possible at the sacrifice of a great deal of leisure for study and preparation.

On the first occasion to which I referred just now, I was honoured with a few minutes' conversation by His Excellency, an event which we of the humbler of mankind naturally appreciate and remember. Lord Stonehaven remarked on the fine weather in Melbourne when he left there the previous day, and I took the liberty of saying that he would not know how really fine the climate of Australia was until after he had been to Queensland. There is, of course, a great difference between weather and climate: the one is very changeable, due to conditions prevailing hundreds and may be even thousands of miles away; the other is the constant attribute of every country and largely depends upon that country's geographical position, with one notable exception. I am quite sure our clerk of the weather is just as pleased with their Excellencies' visit to Queensland as we are, but he appears to be uncertain how best to show that pleasure. He has not yet sent forth his bright sunshine to greet them, which may be due to the fact that we are approaching the season of our mid-winter rains, and if during their travels their Excellencies should come up against this rain, I would ask them to take it as a good omen, even if they are inconvenienced by it, for their first visit to Queensland would become even more memorable if it coincided with a break of the drought from which the greater part of the country is suffering severely.

When they reach the North their Excellencies will see something of the great experiment which Australia is conducting in settling a white working population on its sub-tropical land, an experiment which has never previously been tried at any time in the world's civilization. We know, of course, that the white race can adapt itself to any climate from the Equator to the poles, but hitherto in tropical and sub-tropical countries they have only been birds

of passage acting as directors and supervisors of other people's labour. Here in Australia they will labour themselves. Their Excellencies will see children of the second and even the third generation which compare favourably with those of any other part of the Commonwealth and have been proved by the constant researches of the Bureau of Tropical Medicine to be physically and mentally equal to the other children. My own experience of the North which dates back to the time when life there was much harder, or, if you prefer it, less pleasant than it is now, led me to the conclusion that white men can do whatever coloured men do and do it better, and that the white race can live and thrive there provided only that the people adapt themselves in their mode of living to the requirement of the climate. I am satisfied in my own mind that this great experiment will prove a success.

I mentioned just now that there was one notable exception to the rule that the climate of a country is governed by its geographical position, and the success of our experiment is largely due to the very fortunate fact that this exception lies within our own borders. The sub-tropical lands of Australia, that is, those lying between the tenth and twentieth degrees of latitude south of the Equator, have a totally different climate, a different fauna and flora, from the lands lying in the same latitudes north of the Equator. I cannot explain the reason why it is so; to the best of my knowledge no scientific inquiry into the subject has ever been made, and when the investigations into the Barrier Reef which were initiated by this Society under our late President, Sir Matthew Nathan, have been brought to a successful issue, it may be possible for this Society in connection with other scientific bodies to take up the question I have just mentioned and endeavour to find scientific reasons for it.

The vote of thanks was carried by acclamation.

MY VISIT TO PAPUA.*

By His Grace Archbishop Duhig, D.D., F.R.G.S.A., Acting President, Royal Geographical Society of Australasia (Queensland).

From the time I landed on its shores until I left, Papua was a series of surprises to me. During my visit I marvelled at our ignorance of the country and people when I considered its close proximity to Australia. Here is a land of remarkable contrasts: from the deltaic swamps of the Fly River and sago palm flats fringing the Papuan Gulf to the summit ridges of the great Owen Stanley Range, the contrast of landscape, of climate, of vegetation, and of the conditions of primitive life is everywhere apparent.

With the exception of Australia (which is now generally recognised as a continent) New Guinea is the largest island in the world, having an area of some 340,700 square miles. Its discovery takes us back to the early years of the sixteenth century, when the adventurous Spanish, Dutch and Portuguese navigators were sent out in search of new countries in the interests of trade and commercial enterprise—the times of buccaneering exploits on the high seas. The credit of being the first European to sight the shores of the island is generally given to Antonio de Abreu, a Portuguese commander who, in 1511, made a voyage from the Aru Islands to the Moluccas, the honour of actual discovery being divided between him and Alvaro de Saavedra, a Spanish sailor, who gave a description of the bold outlines of some part of the coast, probably Dutch New Guinea, in 1528. But ages before the advent of European influence in Pacific waters there is little doubt that the shores of New Guinea were visited by Oriental traders in search of the submarine products so abundant on the reefs and other shallow areas of Torres Strait, the Louisiade Archipelago, and the Arafura Sea, as many of the local communities show unmistakable traces of Chinese and Malayan blood in their veins, and occasionally Arab features are noticeable among some of the tribes along the coast of the Papuan Gulf. And ethnologically considered there can hardly be any doubt that even some of the hill people have marked Semitic features, indicating racial admixture. It is recorded that in 1526 the Portuguese navigator, Don Jorge de Meneses, through a miscalculation of his course on a voyage from the Malay Peninsula to the Moluccas, sailed round

* Abridged address (with lantern views) to the Royal Geographical Society of Australasia (Queensland), 8th April, 1926.

the north of Borneo and Gilolo or Jolo, and came to a land inhabited by "Papuans," a name given to them by the Moluccans on account of their frizzy hair. But it was generally recognised that Meneses was the actual discoverer of New Guinea. In the field of maritime enterprise and discovery the Portuguese were closely followed by the Spanish and Dutch navigators, the former being represented by Luis Vaz de Torres, who sighted New Guinea in 1606, and the latter by Schouten and Lemaive who saw the south-west coast of the island in 1676. At the head of an expedition, William Dampier, on board H.M.S. "Roebuck," sighted the New Guinea shores on New Year's Day, 1700, and sailed around the islands off the east coast, which he named New Britain, now mandated territory and renamed by the former German occupants "New Pomerania." He discovered the strait bearing his name and which separates the islands from the mainland, and is generally credited with being the first Britisher to navigate these waters. Dampier was followed by the famous French navigator, de Bougainville, in 1768, and by the illustrious English circumnavigator, Captain James Cook, in 1770. This may fairly be considered as the dawn of a remarkable age of British exploration and discovery, both by sea and by land, not only in the Pacific, but all the world over. In Australia alone a great continent was discovered; its immense coastline, its rivers, its mountain ranges, lateral valleys, vast plains, its rich pasture lands and scattered lakes, have since been explored and mapped out; its vast natural wealth, not yet exploited, has been tapped by the pioneer gold seekers on the scattered mining fields of the immense territory; and during the past fifty-six years much of the country has been settled, developed, and prepared as the home of a great nation into whose hands the destiny of south-eastern New Guinea has passed.

The British discoveries in New Guinea waters were supplemented by Forrest in 1774, by Edwards, and by Captain Bligh of the "Bounty" in 1794, also by the intrepid Captain Flinders in 1799. But it was left to Dumont d'Urville, who voyaged to the east coast of the great island about the beginning of the nineteenth century, to furnish the first definite knowledge of the actual conditions of Papuan life and associated natural history of the country. The expedition commanded by this French navigator landed several parties to examine the unknown shores of the island, and valuable zoological collections were made by the naturalists accompanying them. From now on, interest in these discoveries seems to have spread in European countries, for the Dutch annexed the whole

of New Guinea west of the 141st meridian of east longitude, and in 1825-26 sent Lieutenant Kolff in the man-of-war "Dourga" to explore the south-west coast of that territory.

Dutch enterprise in the field of exploration and discovery in the western portion of the island continued more or less intermittently till 1876. In the meantime the British navy had H.M.S. "Fly" and "Rattlesnake" engaged on a marine survey of the south-eastern coast of the island from 1842 to 1850, and these were succeeded by Captain Moresby in 1871 and 1876.

In the following year the famous Italian naturalist D'Albertis ascended and explored the Fly River—discovered by H.M.S. "Fly" —for a distance, now reckoned in the light of the most recent investigations, of probably not less than 580 miles from the mouth. This now brings the history of New Guinea exploration and discovery to the beginning of what may be regarded as Australian participation in the establishment of British rule in the territory. But had it not been for the timely action of a former Premier of Queensland it is doubtful if any part of New Guinea would have ever been included in the Empire, as Germany was developing her colonial interests in the Pacific and was ready to annex the whole of the territory east of the Dutch boundary. This was anticipated by Sir Thomas McIlwraith, who on 4th April, 1883, instructed Mr. H. M. Chester to take possession of that portion of the island in the name of Queen Victoria. But, presumably for reasons of policy, this bold statesmanlike action was not recognised by the Imperial Authorities, and in consequence an International Conference was held in Sydney about the end of the year to consider the position. As a result the Imperial Government commissioned Commodore Erskine of the Australian Station to proclaim Her Majesty's protectorate over south-east Papua, and appointed Sir Peter Scratchley to be High Commissioner of the territory. This brought the Germans actively on the scene, and forthwith the Kaiser's representatives hoisted their flag at three different points on the north-east coast, followed by an official notification to the British Government that this had been done. Then followed, on 17th May, 1885, an Imperial Charter of Protection granted by the German Emperor to the New Guinea Company to acquire and occupy that portion of New Guinea not under English or Dutch sovereignty, to be called "Kaiser Wilhelm's Land." It was not until 1888 that the mainland territory of British New Guinea and islands adjacent thereto were duly proclaimed as forming part of the British Dominions, Sir William

MacGregor being appointed as the first Administrator, the cost of administration being borne equally by New South Wales, Victoria, and Queensland, executive authority for administrative purpose being vested in the Governor of Queensland. Geographically the annexed mainland territory was officially described as "starting from the coast near Mitre Rock, on the 8th parallel of south latitude, and following that parallel until intersected by the meridian of 147 degrees of east longitude; thence in a straight line, in a north-westerly direction, to the point of intersection of the 6th parallel of south latitude with the 144th meridian of east longitude; thence continuing in a north-westerly direction until it meets the point of intersection of the 5th parallel of south latitude with the 141st meridian of east longitude; giving an area on the German side of about 67,000, on the English side of about 63,000 square miles, and nearly approaching the water-parting line, or natural boundary." To this are added "the Trobriand, Woodlark, D'Entrecasteaux, and Louisiade groups of islands, and all other islands lying between the 8th and 12th parallels of south latitude, and between the 141st and 155th meridians of east longitude, and not forming part of the Colony of Queensland; and furthermore including all islands and reefs lying in the Gulf of Papua to the northward of the 8th parallel of south latitude."

The mainland territory is upwards of 800 miles in length from east to west, and the width from north to south along the British-Dutch boundary is about 300 miles. The total coast-line, including the islands, is about 3,664 statute miles, and the area 90,540 square miles or nearly three times the size of Ireland. In 1905 the control of British New Guinea was assumed by the Australian Commonwealth Government, the possession to be known in future as the Territory of Papua, a designation necessary to avoid confusion in nomenclature and distinguish it from the former German possession, now known as Australian Mandated Territory of New Guinea. Papua has a Lieutenant-Governor, an Executive Council and a Legislative Council. As formerly, the seat of Government is at Port Moresby. No Act of the Commonwealth Parliament has force in the Territory of Papua unless it is expressly stated in such Act. Generally speaking the whole of the mainland and islands of New Guinea are mountainous, the Dutch portion being dominated by the snow-clad ridges of the Charles Louis Cordillera of the west, while the Papuan territory is traversed almost its entire length from east to west by the Owen Stanley Range, the Albert Mountains, their lateral offshoots, and associated foothills. The culminating point of the range is Mount Victoria

(13,150 ft.), first ascended and named by Sir William MacGregor; and the islands, too, comprising the D'Entrecasteaux groups and Louisiade Archipelago, are rugged and mountainous in character, almost bordering on Alpine elevation, and rivalling in altitude and topographical features the Australian mainland. The islands, as well as the adjacent country forming south-eastern New Guinea, are of volcanic formation, composed of crystalline quartz, slate, basalt, micaceous schists, palæozoic and igneous rocks of various characters. Silicious rocks are often deposited in the river channels, and porphyritic and quartz boulders occur in the creek beds. Extinct crater vents and thermal springs are occasionally met with. Alluvial gold deposits and metalliferous areas are not of infrequent occurrence. In the valley bottoms and river flats the soils are rich and fertile, but the country as a whole is not so naturally productive as most of the other Pacific islands. Not that it is lacking in rainfall or natural water supply, as both are abundant, but its extremely rugged character and large swampy areas along the shores of the Papuan Gulf and in the neighbourhood of the big western rivers occupy so much of the territory that the available lands suitable for agricultural or pastoral purposes are somewhat restricted in comparison to the whole extent of country as shown on the maps. The only watercourses of considerable extent are those in the western division of Papua, and then only the Fly River with its large tributary, the Strickland, may be considered of first rank importance. The Purari River, it is true, may be classed as a minor navigable stream for shallow-draught craft, and so may the Mambare, on the north-east coast, near the boundary line, but the areas they drain are insignificant compared to the extensive territory traversed by the Fly, whose main channel is navigable by a launch for about 500 miles, with tidal influence of 200 miles from the sea. There are several smaller streams draining the main central watershed ranges on the north-east and south-west—so the territory as a whole may be said to be abundantly watered.

Being outside the Pacific hurricane belt, Papua is more fortunate than some of the neighbouring islands within the tropics and even north-west Australia. And this is of immense advantage to settlers in the territory. The climate is certainly tropical, as the position clearly indicates. But latitude is not the only factor to consider in determining the climatic conditions of any country. In the low, swampy areas of the western division the humidity is naturally greater than in other drier localities such as around Port Moresby, Samarai, and the uplands districts, but on the whole

the climate is not unhealthy, certainly not any different from that of North Queensland. Malaria is not uncommon in certain low-lying parts, and black water fever is a menace to settlement in such localities. But with prudent care in habits of life both may be avoided, or the risk of attack greatly minimised. On the high lands of the interior the climate is bracing and quite subalpine in character, heavy frosts being common on Mount Victoria and other summit-ridges of the Owen Stanley Range and the Albert Mountains. The year is divided into two seasons—the wet and the dry. The former is regulated by the monsoonal rains, and the latter by the south-east trades, when the weather is comparatively cool and agreeable. This is the proper time to visit Papua, say, from May to September. Ethnologically considered the Papuan is one of the most interesting racial problems of the Pacific. A remarkable feature of the autochthonous inhabitants of the territory is the numerous tribes into which the people are divided and the corresponding number of dialects spoken. Even in near-by villages, of a few miles apart, marked dialectical differences are of frequent occurrence. The Motu is the language spoken and taught by the Missions at Port Moresby, and is understood for some considerable distance both east and west of that place. But in the outside districts many changes and variations of speech occur, so that in the western division, at the head of the Papuan Gulf and in the basin of the Fly River, the Motuan language is not understood. And this is also the case in the eastern end of Papua and the adjacent islands, where the dialectic variations are numerous and confusing. Ethnographically, Papua offers a wide field for investigation, and much could be said on this subject alone, but its treatment must be left to another occasion. The dress of the natives is a matter of much interest, and although not designed on modern fashion lines is yet effective in a country where the most primitive conditions of life exist. Luxuriant nature provides for its children all the covering needed in a climate where modern costume would be singularly out of place. Although the gorgeous get-up of the village warrior and dandy is ornate in appearance, it shows the designing faculty and resource of the mind to a considerable degree, and one cannot help wondering at the patience bestowed by the wearers in placing the ornamentations in the most effective positions. Of course the brilliant plumage of some of the Papuan avifauna contributes in no small measure to the effectiveness of the native toilet, as their head decorations and ornamentation of their weapons are largely composed of the feathers of the birds of paradise and other beautiful forest fliers.

Besides their plume ornamentations, the Papuans give much time and attention to the manufacture of shell ornaments and ornaments made from ivory, wood, and bone. Of their marriage laws, their religious rites and customs, little is known outside their local communities. Wives are said to be obtained by purchase, but more likely the usual practice of offering presents to the bride's relatives has led to the supposition of actual purchase, when in reality the contracting parties were merely conforming to an old time-honoured institution. Polygamy is recognised, but the hard struggle of life in many districts restricts the practice to a minimum.

Vegetable food is the chief diet of the natives. In the rich agricultural areas, yams, taro, and sweet potatoes are cultivated, but in poor, dry and semi-arid localities it sometimes happens that food is scarce and wild uncultivated roots and tubers are consumed as substitutes. These are occasionally supplemented by flesh obtained by the hunters, and those living in coastal villages and along watercourses are able to have fish, but as a rule the wild vegetable food is scarce and unpalatable. The absence of indigenous and even cultivated fruits in some of the fertile districts is a material want and detracts much from the natural resources of the territory. Being of a warlike and fighting disposition, the various tribal communities give much time and attention to the manufacture of weapons as well as to their practice. The weapons are mostly the bow and arrow, the spear, and several forms of stone and wooden clubs. The arrows are strong shafts of wood or reed, pointed with various effective substances, some with bone, some with the great toe of the cassowary, and others with very hard wood, often the wood of the palms. In addition to these the head hunters use what is commonly called a man-catcher, shaped something like the net-frame used for catching butterflies. This is thrown over the head of the pursued victim and is so constructed that a projecting spike enters his neck at the base of the skull, when he drops instantly and is at once decapitated by the hunter. This gruesome business was witnessed by Sir William MacGregor, who went on a special mission to suppress the practice carried out periodically by a tribe located on the Dutch side of the western boundary and who used to make frequent raids into British territory, keeping the local inhabitants in constant fear and dread. The implements commonly in use are the ordinary steel knife and tomahawk and the local shell and stone articles. Some of the native stone adzes are beautifully polished, showing graceful execution of workmanship, and are very effective in the hollowing out of logs of wood for canoes. The large Motu canoe, called "Lakatoi,"

when fully manned and under full sail, is quite a feature in the near horizon. The trading canoe is probably from 40 to 50 ft. in length, about 3 ft. in depth, and the same in breadth. It is constructed of several hollowed-out logs lashed together so as to form a great raft. The mast is made of the mangrove tree and the sail is composed of matwork sewn together in proper shape, the whole being kept in position by home-made ropes from hibiscus bark. Some of the native villages are not at all attractive, surrounded as they often are by swamps and mangroves, with the approaches leading through tidal mud flats. Others are built in the sea, the houses standing on stilts. But there are other villages located in lovely groves of cocoanut palms in the midst of beautiful scenery. Some of the houses in the Papuan Gulf country particularly are of enormous size, a club house for men over 500 ft. in length being of common occurrence. Others, called "elamos," are remarkable for the height of the front part or entrance end, which is probably not less than 70 ft. from the ground. Houses built in the tree-tops are also met with and are a feature of the landscape, especially back from the coast. Access is obtained to these by primitive ladders. Their main purpose is as look-outs for hostile neighbouring tribes, and for defensive purposes they are well stored with stone missiles.

WILKINS' AUSTRALIA AND ISLANDS EXPEDITION. *

A report on some geographical features that differ from those shown on Map Section No. 21a, issued by the Lands Department, Brisbane.

By Capt. G. H. Wilkins, M.C., F.R.G.S., December, 1923.

In the course of my duties in connection with the above expedition I visited the areas about Temple Bay and Cape Grenville and made a trip overland to Moreton Telegraph Station, Cape York Peninsula. I used for reference the Queensland Lands Department's map 21A. A sketch map has been drawn on which several features that differ from the chart are shown. These features were noted during travel, and the general direction verified by means of a pocket compass. With the exception of the river that empties into Temple Bay, the direction of the watercourses were drawn in from commanding heights and partly from information received from an aborigine guide. The course of the Macmillan River was sketched in by means of compass directions and distance estimated from a rowing boat to a point about 8 miles in a direct line from the coast. Further inland and to the south, a branch of this river was followed for a considerable distance, starting from a point that can only be estimated, for I did not carry a sextant or theodolite with me on that trip.

A traverse was made from the north bank of the river to the top of an escarpment that is, apparently, a spur of the Richardson Range. The geological terms used are necessarily broad, for the samples collected have not yet been classified.

We travelled south from Thursday Island by motor launch, and landed at the foot of Margaret Bay and at a point on the beach where a small stream enters the sea. The water in this creek was tidal as far as we followed its course. It runs parallel with the shore for about 800 yards, and then, turning westerly, it disappeared behind a belt of mangroves.

A larger stream enters the bay a mile or so further north and later, from observations I made, from the hills on Cape Grenville and from the spur of the Richardson Range. I was led to believe that this stream rose to the north of the spur referred to, and flowed first through low bush country studded with anthills and

* Originating in Lecture to the Royal Geographical Society of Australasia (Queensland), 4th June, 1925.

then through the low scrub and mangroves nearer the beach, maintaining a general easterly course throughout. Several small branches appeared to rise from swamps and enter the stream from the south, but a low range or ridge, extending from the foot of the Richardson Range to the sandhills on the coast, divided these waters from those that emptied into the Macmillan River.

It had been planned to establish a camp in Margaret Bay and make use of the Macmillan River as charted as means of reaching the inland hills. The river that empties into Margaret Bay did not appear to offer satisfactory means of communication, and I finally established the camp on the beach to the south of Cape Grenville, and in the shelter, from the south-east monsoon, of Gore and Orton Islands. We spent a fortnight at this camp, during which time the members of the party hunted over practically the whole area of Cape Grenville. A few wallabies were seen, but animal life in general was scarce. A few old native camps were seen, but the seven natives seen in that vicinity said that it had never been a good hunting ground for game, but that roots, crops, yams, &c., were plentiful.

The hills are mostly sandstone with some igneous intrusion showing here and there, but we did not find any quartz in reef formation.

In an effort to locate better hunting grounds, I traversed the coast from Cape Grenville to within a mile or so of the Olive River as marked on Map 21A. From the southern end of Cape Grenville a curving sandy beach extends to form the one-mile arc of a chord and to a rocky point at the head of Indian Bay. The rocks at this point are thickly covered with oysters, and on the hilltop are several designs set out in white stones, and the place appears to have been the meeting-place of the natives.

Running down the south-western side of the point is a short, sharp gully in which a great deal of glazed sandstone is exposed.

Beyond, the shore line is rocky for a few hundred yards; and off-shore, in Indian Bay, lies a small island about 1 mile in circumference, on which a few pandanus palms are growing. Behind this island is a belt of mangroves that reaches out into the sea, but the water is only 2 ft. deep at low tide, and the bottom is hard and sandy. A ship's dinghy, the property of the natives of the country, lies moored to this mangrove belt. A small freshwater stream enters the sea at the south side of the mangroves. A low sandy beach sweeps from here for about two miles, but is cut in the centre by a small stream, with pandanus, but no mangroves, at its mouth.

From the southern end of the beach to the mouth of the Olive River, belts of mangroves and sandhills alternate, and through each belt of timber a small stream enters the sea. At low tide it is possible to travel the beach from the mangroves at Cape Grenville dry-footed, except for the small freshwater streams. Lagoons and low marshy flats lie behind the sandhills that border the beach until a high bluff rises from the water at a point about four miles from the river. The bluff is composed of sandstone cut with seams of granular quartz and "pudding stone." According to the natives, some prospectors searched this hill for gold, without success. South of this bluff a low sandy beach extends to the river, but is broken half-way by a small but conspicuous cliff.

At high-water the mouth of the river is about 2 miles wide, but at low tide it narrows to about 300 yards, the deep water being at the south side, while white sandbanks are exposed to the north. This north shore is gradually building around scatter-clumps of mangrove, and this point may be a suitable area in which to observe the speed of land-building as the result of river deposit and mangroves.

We moved our camp to a sandbank on the south side of the river, where many old native gunyahs were found, and from the oddments lying about it appeared that ships had anchored here to take on fresh water. Two tracks had been cut through the mangroves from the beach to a small stream nearby. In attempting to bring a cutter into the river at low tide we narrowly missed an accident, for the vessel grounded on the bar. There is, however, 2 fathoms on the bar at high tide. The bar lies some distance from the shore, and when we were there we did not observe any special channel. Vessels wishing to enter should cross the breakers directly east of the point at the foot of a high hill on the south bank, then keep about three cables' length from the beach abreast of the point. They should then close in to the south bank until the first bend of the river is reached. Once over the bar the river is navigable, for boats drawing 4 ft., to a point some 6 to 8 miles inland, at any tide. During one wet season, a native told me, a cutter had travelled some distance further up the stream in search of sandalwood. I followed the river in a rowing boat for a distance of about 15 miles to reach a point about 8 miles inland, where our way was blocked by fallen trees that reached from bank to bank. About 2 miles from the entrance of the river a branch enters from the north and the stream narrows to about 200 yards. The branch was traced for a distance of about 4 miles, and to where it rises in a swamp.

The main branch turns westward, with many bends, and a small stream enters from the north about 2 miles further up.

At a point about 5 to 6 miles from the coast a branch enters from the south, and we followed this for a mile or so in a S.S.E. direction. The native guide said that this branch rose in a series of long and rather narrow swamps.

About 2 miles further on the stream is divided into three; one stream came in from the north, one from N.N.W., and the other west. We did not follow the northern one very far. The one from N.N.E. was found to be a fork of the other stream, and the two joined about a mile further upstream. The river continued with many bends, in a westerly direction for 3 or 4 miles, and then forked. From that point onward the way was blocked by fallen trees, so we turned down stream for a mile or so and made camp on the northern bank.

From there we set out on foot across a low pitcher plant and pandanus swamp to the foot of a spur of the Richardson Range. Approaching the foot of the hill, we passed through a mile of thick scrub, through which a way was forced with difficulty. At the foot of the hills was a small running stream, and from the summit it seemed that this stream flowed in an easterly direction and then turned south to join the north branch of the river. Away to the north we could see the coastal sandhills and several conspicuous peaks some distance inland. A conspicuous pinnacle lay a little west of south. South-east "Conspicuous Clump" could be seen, and a little more to the south the hills of the Macrossan Range cut the horizon. To the west, over the spur, lay a broad valley, and beyond that the main divide. To the south-west the land was low-lying as far as the eye could see. To the east, but slightly north, a low, almost imperceptible ridge seemed to divide the waters of the Macmillan River from the creek further north, and in my notes I referred to that creek as Harmer Creek (after Sir Sydney Harmer, Director of the British Museum Natural History), for it appears from my observation that the waters of the Macmillan River, named by Dr. R. L. Jack in 1880, had an outlet in what was named the Olive River by the officers of the "Paluma" in 1893-4. This northern stream then had no other name to which I could refer.

The bed of the river that empties into Temple Bay passes through a marshy plain until near the coast, when it skirts a sandstone ridge beneath which lies an apparently extensive deposit of rock that resembles phosphate. Several exposures of this material were noticed at a point on the south bank, near water level, and about 2 miles along the bank from the coast. It is about 100 yards beyond a narrow quartz reef, and at a short, sharp bend in the river. A few yards further on, a small clear stream issues from fissures in a sandstone wall.

The areas near the river mouth are fairly well covered with ti-tree, bloodwood, and other northern growths, and here and there is a patch of which scrub that appears to be almost impenetrable from the outside, but through which it is comparatively easy to walk when once inside. These patches are usually in long narrow belts, and may be avoided by skirting them. On the summits of most of the ridges near the coast are clumps of pine trees.

We traversed the beach from the mouth of the river to the bottom of Temple Bay, where a dense mangrove swamp fringes Glennie Creek. A sandy beach may be followed for most of the way, except at Bolt Head and Red Cliff, and behind these are comparatively easy overland routes. This part of the coastline has been reported on by Dr. Jack and others. On a journey from the mouth of the river to Moreton Telegraph Station I was accompanied by an aborigine named Johnny, an old man who claims to have been with a party of surveyors some years ago.

We crossed the hills that lie to the west of the river mouth, and followed a westerly course along a pitcher-plant swamp for about 2 miles, and then as the swamp turned northwards we were forced to cross it. Even at the end of a very dry "dry" season (August, 1923) it was necessary to "pave" a way with reeds and bushes for 100 yards or so, in order that I might cross with a heavy pack. Johnny, without a load, and bare-footed, could have crossed easily and without sinking deeply into the mud. Beyond the swamp we crossed undulating sandy country for about 5 miles, until we reached the bank of a southern branch of the river.

We kept to the southern side for a mile or so, and then crossed the stream and followed the northern bank, round a sharp bend,

in order to camp at a regular meeting-place of the natives. Judging from information gathered from the natives, this branch of the river joins the main stream at the point reached by us with the boat. There were two families beside Johnny's at the camp, and a man who was "wanted" for the murder of a "medicine man" from a neighbouring tribe. The medicine man had failed in a surgical operation by which he tried to cure a youth of a throat affection. The boy died, and the man in the camp had revenged his death. The natives were suffering from a bad type of cold and expressed their regret at not being able to offer me any assistance, but in general they were very friendly. A large colony of flying fox occupy an area on the southern bank of the river near here, and the natives collect a number of these animals for food. We continued our journey along the river bank for about 4 miles, in a southerly direction, and then struck west in order to cut off a large bend. We passed through "open timber," meeting an occasional belt of scrub, which we skirted. We met the watercourse again where it forked, and followed the south branch for a mile or so, and then passed between two low hills, on the northern one of which I saw some sandstone *in situ*, the first we had seen since leaving the coast. Rounding the hill to the south we followed its slopes for a mile and a-half, and reached a small creek which my guide told me flowed to the north and then turned east to join the main stream at the point we had reached by boat. We camped with two native families beside this stream, and they as all others we had met were friendly.

In the morning we crossed the stream, and following a short branch soon climbed to the top of what appeared to be the top of the main range of the Divide at that latitude. We followed the top of the range to the south for about 3 miles, and Johnny explained that by doing this we would avoid a number of belts of thick scrub. I did not carry an aneroid, but estimated the height of the range at about 1,000 ft. above sea level. The top of the range was practically flat for the distance we travelled, and while I did not see rock *in situ*, the surface was covered with quartz, porphyry, sandstone, and ferruginous material. We descended a slope bearing to the west, and crossed a creek which emptied, so my guide said, into the Batavia River. There were a few pools of water here and there in its bed, and I was warned that this was the last water we

should see until almost within sight of Moreton Telegraph Station, unless by good fortune we found some in a muddy pool that Johnny knew to be about 2 miles out on the plain from the foot of the hill.

We found the pool and obtained a little muddy water, and from there took a south-east course to Moreton Telegraph Station. Throughout the journey we had avoided most of the thick, dense, scrubby patches and many of the wet swamps by skirting them. The country on the eastern slopes was sandy and produced a high tall grass that had been 4 to 6 ft. high a few days before we started, but which, fortunately for us, the natives had burned from the most of the route, and we travelled over cleared, charred ground. We came to some red patches of soil and a few small patches of black soil soon after crossing the Divide, but it was not until after passing Moreton Station and on the mail route to York Downs and Merluna Station that we met with any of the "melon-hole" or mullinar country. From Merluna to Mein Telegraph Station this type of country was particularly conspicuous. I passed from Mein through the Plutoville goldfields on the Batavia River and then along Tin Creek to the Archer River, and then followed the telegraph line to Coen. From Coen I travelled by the carters' route to Port Stewart, and from there by boat to Townsville. The route from Moreton Telegraph Station south to Coen is travelled by a mailman once a fortnight, and is well known. Carters and prospectors have been over the route from Coen to Port Stewart many times.

EARLY DISCOVERIES IN THE NORTHERN TERRITORY.*

By The Rt. Revd. Stephen H. Davies, Bishop of Carpentaria.

I do not propose to deal with the whole of the Northern Territory, but only that part of it on the north coast from Cape Wessel to the Western Australian border. This is by no means a complete history of the early exploration of these shores, but rather items of interest to the writer up to the time of the abandonment of the military post at Port Essington in 1849.

The earliest record of the discovery of Australia seems to be in 1499. The wooden globe of Paris, one of the most famous geographical records extant, made about the year 1535, bears an outline of a continent in the far south, having inscribed on it the legend: "*Terra Australis recenter inventa Anno* 1499."

About the year 1600, after the founding of the East India Company, English ships began to compete with the Dutch for trade in the East. These ships sailed via the Cape of Good Hope, past the islands of St. Paul and Amsterdam, thence making the west of New Holland. Dutch navigators recommend making this land at latitude 26° or 27° south, but the British ships usually made it at latitude 22° or 23° south. We have the record of an English ship, the "Tryal," wrecked in 1622 on rocks now known as the Tryal Rocks; some of the passengers got away and arrived in Batavia, reporting the wreck to have taken place at latitude 20° 10′ south. I mention this because the bearing led to such a great dispute in shipping circles as to the exact location of these rocks. Lieut. P. King was ordered in 1817 to look for them, and since his day naval surveyors have located them.

In 1619 affairs in Europe made it necessary for an agreement to be come to between the English and Dutch East India Companies. This agreement was imposed upon the companies by James I. and Stadtholder Maurice of Nassau and their ministers. Previously trade had been carried on under armed protection; for instance, in 1620 one Martin Pring, merchant and sea captain of Bristol, as "General" of English forces then in the East, sailed

* Read to the Thursday Island Branch of the Royal Geographical Society of Australasia (Queensland).

with twelve sail through the Straits of Sunda to attack Governour-General Coen at Batavia, in revenge for his attack and defeat of Sir Thomas Dale at Patani and Tecoe three years before. Pring found himself faced by sixteen Dutchmen, seven of exceptional size and armament. But news of the peace treaty of 1619 had been received, so there was no fight. The "Tryal" was the English vessel that carried the news of this treaty out. The Dutch had received word from their own Company. Martin Pring unfortunately sailed away to Japan, otherwise the incident at Amboyna might not have taken place. In February or March, 1623, this affair happened. English and Dutch had their factories side by side through the Straits; they were to be at peace, the Dutch getting two-thirds and the English one-third of the trade. The orders of the directors in Europe do not seem to have been well received by either nation in the East. There was friction, leading to law cases, and at Amboyna to worse. Here the Dutch commander of the fort, Herman van Speult, arrested and executed the English factor, Gabriel Towerson, with nine English companions and ten Japanese servants. The charge of conspiracy to take the fort will be seen to be unfounded when it is remembered that there were two hundred Dutch soldiers, also some Japanese mercenaries in the fort, and eight Dutch ships in port, one of 1,400 tons and another of 1,200 tons.

It is well to keep in mind this early history of the Dutch East Indies, so close to Northern Australia, for it certainly had something to do with the early surveying of the coast and military settlements. We also realise that many ships must have seen the coast. By 1620, ships were coming from Europe to the Dutch territories regularly. In 1684 the English East India Company founded a trading centre at Bencoolen, on the coast of Sumatra, carrying on business with China and some Malay trade. They issued instructions to look for another centre for the Malay trade; this was found in 1786, when Penang was selected. By 1805 the Company had constituted Penang a regular Presidency, with a Governor in Council. Sir Stamford Raffles was the person selected as Governor. In 1807 Sir S. Raffles met the Governor-General, Lord Minto, in Calcutta, and this led to Lord Minto appointing Sir S. Raffles Lieutenant-Governor of Java in 1811. Lord Minto had sent an expedition from India to conquer Java because Napoleon had annexed Holland; therefore Java in 1810 was French and not Dutch. Five years afterwards the English handed Java back to the Dutch (1816), much to the disgust of Sir S. Raffles, who on his return to England advocated establishing a trading centre

at and the annexation of New Holland. We know he succeeded in making the settlement at Singapore, thus overcoming the Dutch. But it was probably due to Sir S. Raffles's agitation that on 6th February, 1817, Lieut. P. P. King received instructions in England to proceed to New Holland to "survey the unexplored coast from Arnheim Bay, near the western entrance of the Gulf of Carpentaria, westward and southward as far as the north and west Cape overlooking the opening or deep bay called Van Diemen's Bay. You will remain on this service till you shall have examined all parts of the coast which have not been laid down by Flinders or M. de Freycinet, or until you receive further orders."

Lieut. P. P. King, R.N., left Sydney on 21st December, 1817, in the cutter "Mermaid," of 84 tons, to survey the north and north-west coast. Allan Cunningham, botanist, accompanied him, and it is to his diary that I owe most of the information here contained of the first and second voyage of the "Mermaid." On this first voyage King surveyed 500 miles of coast line. He sailed from Sydney round the west coast of Australia, arriving at Oxley Island, 24th March, 1818. Working south from here on 27th March he found a suitable anchorage in a bay on the south of Goulburn Island, where he could water his ship and get wood. King used this on all four of his voyages round the north coast. On 30th March Cunningham says the watering party were attacked by natives, who rolled large stones over the edge of the cliff under which the seamen were taking in water. No damage was done, and by King's returning here on his other voyages he evidently did not consider the attack very serious or the natives very aggressive. It was otherwise with the Malay proas that he saw; he was careful to keep away from a large number when together, though he tried to get into communication with individual proas, his means of introduction being a letter in Malay written for him by Sir S. Raffles, but these proas worked as a fleet under an Admiral, and they showed the Dutch colours whenever King showed his colours. Leaving Goulburn Island on 8th April, King surveyed the coast towards Raffles Bay. Rounding Cape Cockburn, he sailed down Mountnorris Bay, landing on Copeland Island, where he found the Malays did a great deal of their curing of trepang. In making for an opening that is now known as Bowen Straits, he found the waters shoaled, and, therefore, turned north up the eastern side of Croker Island. He landed on this island at Palm Bay, and satisfied himself that is was an island cut off from the mainland. So we find that King and Cunningham were the first two white men to see Bowen Straits, out of which a great deal of the pearl shell exported

from Darwin is now obtained. Passing into Raffles Bay, which King named, as he did most of the places I mention, he found the bay to be about 4 miles deep and 6 miles wide, but, owing to its being surrounded by mangrove swamps, a very difficult place to water his ship. Leaving Raffles Bay on 18th April, he arrived the next day in Port Essington, staying here for a week. Of the soil at Port Essington, Cunningham says—"The soil has nothing to recommend it, and the eucalyptian timber is small." Again he says—"This large and spacious port, in which we have been since the 19th, is called Port Essington, whose harbours afford shelter and protection to shipping; but the land being so deeply overrun with mangroves and the want of fresh water render it useless for agricultural purposes." Passing on to Popham Bay, King found here many Malay proas, with tents and bamboo houses on the beaches. This seems to be the only place where the "Mermaid" was visited by Malays, but unfortunately they were illiterate and could not read the letter King had. King then passed into Van Diemen's Gulf, naming Aiton Bay, Mts. Roe and Bedwell, May Island, and the Alligator Rivers. Cunningham was rowed up the South Alligator about 25 miles, but was not impressed with the nature of the soil. King did not sail through the Vernons on the south of Melville, but turning first north, then west, sailed along the north of Melville Island, passing Piper Head on 16th May. Here he made, perhaps, his most important discovery, that of Apsley Strait, between Melville Island and Bathurst Island. By the 18th May he sighted an island off the south entrance, but on the 20th Cunningham says, "King not deeming it prudent from the nature and result of the soundings this morning to attempt a passage through the south entrance, returned north." King considered this place well suited for a settlement, considering it from a naval point of view, for it offered great facilities for docking vessels, owing to the rise and fall of the tides. This rise and fall, according to Cunningham, is 15 ft., and the depth of the Strait 15 fathoms. King sailed round the north and west of Bathurst Island and viewed the Vernon Islands and the south entrance to Apsley Strait before leaving for Timor and Sydney. Between 8th April and 31st May he had made a running survey of about 500 miles of coast line. On the following year he returned again, this time by the inner Barrier Reef passage, where he filled in some of the blanks in Capt. Cook's and Capt. Flinders' charts between Endeavour River and Cape York. Still using the "Mermaid" and again accompanied by A. Cunningham, King doubled Cape York on 24th July, sighted Wessel Islands on the 27th, and anchored at Crocodils Eylandts (of old Dutch charts)

30th July. He did some surveying about here, especially of Liverpool River, up which Cunningham was rowed 40 miles. "It bears all the character of Alligator River of our last voyage," he says, "land on either side, extensive low grassy flats, subject to inundation. . . . the soil a stiff clay." The "Mermaid" made a stay of ten days at Goulburn Island, and sailed for the Vernons on 8th August. King writes:—"At daylight on 28th August we found ourselves near the land to the south-west of Vernon Islands, which were also in sight. To the south was a deep opening, tending to the south-east, of a river-like appearance, but as it did not seem to be of sufficient importance to detain us, we passed to the westward." That is what King thought of Port Darwin, now in Admiralty Sailing Directions:—"Probably will continue to be the principal port in the northern part of Australia, and the port of call for the largest steamers communicating with China, Singapore, Java, and India." King continued surveying down the coast, calling at Peron Islands, where, according to Dalrymple, Tasman met his first Australian natives. The "Mermaid" put in at Port Keats, which name was given to this bay by King, but as no water was found, they sailed on down the Western Australian coast. The importance of these surveys by Lieut. King are that they were in the hands of the Admiralty in London when it became essential that some settlement should be placed in the northern parts of Australia owing to, first, fear of the Dutch monopolising trade there as they had done in the Eastern Islands, and later, fear of a French settlement.

In a letter dated 15th September, 1823, a merchant (Sea Captain W. Barns) wrote to Earl Bathurst, proposing that a settlement should be made in North Australia, because he said that the Dutch had monopolised the trade in the Eastern Islands, and were likely to do so in Northern Australia. W. Barns says that he had had twenty years' experience in the Malay trade, and recommends the establishment of a settlement in the Gulf of Carpentaria. He further says that in 1823 he knows that between thirty and forty vessels of an average tonnage of 100 tons were on this north coast procuring trepang valued at 50s. per cwt. Owing to this valuable trade the Dutch proposed a trading settlement. On 13th December, 1823, John Begbie, writing for the East India Trade Committee to the Under Secretary (Horton) for Earl Bathurst, says that these merchants think Port Essington in Coburg Peninsula to be the best-suited place, as it was about there that an average of 200 Malay proas made their headquarters, their tonnage being from 30 to 50 tons. These merchants had not a high

opinion of Singapore, and say—"The uncertainty of the retention by the British of the newly acquired settlement at Singapore ought to have some weight in the consideration of the present question; and however important that place may be in the western division of the Indian Archipelago for the diffusion of British manufacture in Cochin China and Siam . . . yet the local advantages of Port Essington, both for defence and support, are greatly superior." They propose to settle this port with Chinese and Malays, 10,000 of whom were already at Singapore. In January, 1824, John Barrow, Secretary to the Admiralty, wrote to Under Secretary Horton, urging the immediate importance of getting Earl Bathurst to act. He wrote—"Indeed, I believe it is admitted, though not provided for, in the Law of Nations that *occupancy* is a stronger title than priority of discovery." He also urges that the prosperity of Singapore is due to its being a free port, a claim made by some responsible persons as the great necessity for Darwin to-day, if that place is to prosper. Earl Bathurst then took action. On 17th February, 1824, he wrote to the Lords Commissioners of the Admiralty, asking them to send a ship of war to take possession of North Australia. The ship was to call at Sydney, where the Governor (Sir Thomas Brisbane) would supply stores and marines for the establishment of an armed post, the settlement to be either in Apsley Strait or Port Essington, but if neither were suitable, then in the Liverpool River. That Earl Bathurst considered the merchants and trade seems most improbable, for King does not mention seeing any Malay proas or signs of visits in Apsley Strait. The merchants seem to have been intentionally left out, for letters passed between W. Barns and Under Secretary Horton, and between a Mr. G. G. de H. Larpent (for the East India Trade Commissioners) and Under Secretary Horton in the matter, but the Government would not give W. Barns any sort of official position. These merchants then informed the Government that they were sending W. Barns out in a schooner that they had purchased, called the "Stedcomb." This vessel arrived at the settlement in Apsley Strait, we know, for in February, 1826, she was sent to Coepang for supplies for the garrison, but was captured by pirates on her way there. Captain Bremer was the naval officer appointed to establish the settlement, but was evidently told not to delay too long. He reported that on 20th September, 1824, he passed into Port Essington, "a navigation dangerous and intricate." The next day he searched for water, sending four boats out, but found none. The country "on the east side was burnt up, the soil sandy, and the land thickly interspersed with ironstone." On the "west side the soil

was better, and the country more open," but he found no water. He left Port Essington and proceeded to Apsley Strait, where again he searched for three days before he found water in King's Cove. "The soil," he says, "of this island appears to be excellent. . . . We found a fine vegetable mould about 2 ft. thick, then soft sandstone rock. . . ." The climate of these islands as far as I can form a judgment is one of the very best that can be found between the tropics. . . . With the extent and capabilities of this fine port it is not necessary for me to trouble their Lordships by a comment. . . ." He left Capt. M. Barlow in charge. When Capt. Bremer's report was sent by the Admiralty to Under Secretary Horton for Earl Bathurst to see, there was noted on it: "I have no doubt that in a commercial point of view it will become another Singapore." This report only reached Earl Bathurst in April, 1825, but by April, 1826, the views of the merchants had evidently been expressed to the Government about Apsley Strait as a trading centre for Malay trade. On 6th April, 1826, Under Secretary Hay (now in place of Horton) writes for Earl Bathurst to the East India Trade Commissioners (J. Begbie)—"Without entering into the question of eligibility of the spot already chosen for settlement on Melville Island, His Lordship is disposed to direct a further trial be made of the coast to the east. . . . Earl Bathurst did not expect to hear of the difficulties of navigation of Apsley Strait, as these are not acknowledged by Capt. King or any other navigators who have been employed in that quarter." By the following year (April, 1827) the Government had further proof of the unsuitability of Melville Island for settlement. Major Campbell had relieved Capt. Barlow in September, 1826, and in a report dated 8th April, 1827, he speaks of the prevalence of sickness in December:—"I most certainly cannot consider this so healthy a place as I was led to believe when I relieved Capt. Barlow." Of the soil, he says it is "in general poor, light and sandy, mixed with a proportion of gravel and stone." He also points out that there is great difficulty in navigating Apsley Strait from the south, and that the anchorage is not the best in the world, and that the currents are so bad that boats drift. He reported to the Colonial Secretary and recommended the abandonment of the settlement because of the difficulty of navigation in the Strait and it was far distant from the Malay resorts. By June of this year (1827) the second settlement, that Earl Bathurst was disposed to make trial of, had opened in Raffles Bay. Capt. Stirling, of H.M.S. "Success," reported to both the Admiralty and Governor Darling on the opening. He had inspected

Croker Island first, as directed by Earl Bathurst, but found this not suitable. "At Raffles Bay," he says, "there is a secure anchorage of easy access with abundance of fresh water, and certainly a resort of Malays," because he found there many curing places for trepang. This report was written 20th June, 1827. In July the "Success" left Raffles Bay, leaving Capt. Smyth in charge. Four months after, in October, Capt. Smyth reported to Governor Darling that the place is unhealthy, already they had had scurvy, that boats found great difficulty in locating the port, that he had visited Port Essington and regretted that this port was not inspected before Raffles Bay was selected. In November, 1827, Major Campbell, from Melville Island, visited the new settlement at Raffles Bay, and reported to the Colonial Secretary, telling him of the distress he found there, and regretting that both here and at Melville Island settlements were so hastily made, as he had visited Port Essington, which seemed a more suitable place. These two gloomy reports were despatched just after events had taken place that might cause them to be exaggerated. The writers certainly wished to get away from their present surroundings. At both places (Raffles Bay and Melville Island) the garrisons were suffering from scurvy. At Raffles Bay the assistant surgeon (Woods) had just died, and when Major Campbell returned to Melville Island he found that Dr. J. Gold with a companion named Green had been killed by natives. Both settlements had great difficulty in getting fresh meat and vegetables. Major Campbell says that during the first four years of settlement at Melville Island two-thirds of the cattle died ten to fourteen days after being landed, and of the buffaloes landed from Timor one-third to one-quarter died after being landed, but sheep lived yet never fattened. The garrison was left at Melville Island until March, 1829, when Capt. Stirling, in H.M.S. "Success," removed it to Swan River.

Of the possibilities of Raffles Bay becoming a suitable centre for the settlement, there seem to be very contradictory reports, A. Cuunningham, botanist, who was with King when he discovered the Bay in 1818, says that the difficulty of watering vessels owing to the obstruction of mangroves is a great objection; Captain Stirling in 1827 says:—"It is a safe and convenient anchorage for vessels of any description at all seasons of the year; it is approachable with ease, and free from danger. It offers abundance of excellent fresh water for the use of settlement or for the supply of ships." The same year Capt. Smyth reported that Raffles Bay is hard to locate; and Major Campbell condemned it as a port:—"It is very shallow, having only 3 or 4 fathoms of water, and along the whole

of its eastern side is a shoal to a distance of three-quarters of a mile from the shore, having at low water about a fathom at that distance. On the western side the water is deeper, the shores having steep banks." It seems probable that these reports led the Government to decide to abandon Raffles Bay in 1829. This decision to abandon this post came as a surprise to those living there. Three causes were given for moving this garrison to Swan River in August, 1829: the hostility of the natives, the non-intercourse with Malays, and the unhealthiness of the climate. There had been trouble with the natives when Capt. Smyth was in charge, but with the arrival of Capt. Barker in 1828 this had stopped. The Malays had visited, and came again in 1829, after the abandonment, to trade, being disappointed not to find merchants there. An unfavourable report as to the healthiness of Raffles Bay had been sent in by the surgeon immediately after his arrival. This surgeon altered his opinion after twelve months, but too late to save the settlement. It seems more probable that the Government knew that they must abandon Melville Island, and had decided to make a settlement at the Swan River, which had been reported on very favourably by Capt. Stirling, and the French were thinking of settling there. Rather than have two weak settlements at Raffles Bay and Swan River, the Government decided to establish one strong post at Swan River, especially as reports from Raffles Bay seemed to contradict each other.

All idea of colonising the north coast seems to have been abandoned in 1829. But in 1838 news arrived that the French were fitting out at Toulon, their naval base, an expedition to take possession of some port in North Australia. At once Sir J. J. Gordon-Bremer, in the 28-guns ship, "Alligator," with Lieut.-Com. Owen Stanley in a brig of 10 guns, was ordered to proceed *via* Sydney to Port Essington. In Sydney they were told to pick up Capt. John MacArthur and some marines who were to stay and garrison the post. These ships and a transport arrived at Port Essington in October, 1838, only just in time, for before the end of the year news came that Commander D'Urville with the French ships "Astrolobe" and "Zélée" were in Raffles Bay, 4 miles away, building houses. The Dutch were entertained by the English in Port Essington later, and then left the coast. This settlement lasted eleven years. It was only a naval station, at which merchants and traders were not wanted. Sir J. J. Gordon-Bremer issued the following notice:—"Notice is hereby given that persons of respectability resorting to Port Essington for purposes of trade will be permitted to occupy, for a period not exceeding seven years,

town allotments containing each one-half acre of land within one mile of the pier at Victoria, and suburban allotments of five acres each within five miles of the same." Of the soil, Capt. Owen Stanley reports to the Admiralty:—"Although there were many patches fit for cultivation with but little labour, yet upon the whole I should pronounce it to be rather unproductive." This seems to me to be the right view of the nature of the soil all along this north coast. In 1849 the Governor of New South Wales asked Capt. Owen Stanley, then of H.M.S. "Rattlesnake," to make a report on Port Essington. He said:—"I found during my recent visit to Port Essington that the settlement had made very little, if any, progress since I left it in 1841." Capt. Keppel, of H.M.S. "Meander," was commissioned to remove the garrison in 1849, one reason given being that it had not answered the purpose for which it was established, of giving assistance to ships and shipwrecked mariners in Torres Strait. Capt. Everard Home was anxious for Cape York settlement. The contrary views and opinions expressed in these early days on the possibility of settling a white population on this north coast prevail to the same extent to-day; there is a great deceptiveness about this north coast that leads opinions astray. Men fail to visualise the whole vast area of land, and have pronounced opinions based on seeing a small area and assuming that all is alike, and they report and form opinions on the climate after staying two or three months, instead of judging this over a period of years. There are very fertile flats of good agricultural land formed by silt accumulating in hollows in the short, heavy, wet season, but these are subject to floods. Drainage is probably impossible, and, owing to the heavy wet season, certainly impracticable and too expensive, until land becomes more valuable. There are also non-flooded very fertile small areas surrounded by vast barren areas, as on Cape York. History shows us that there was at one season of the year more shipping on this coast than there is now, for 200 years before 1849 the coast was known and visited, yet the private enterprise of Malays, Japanese, and others never made permanent establishments when there was nothing whatever to prevent them by way of restrictions and customs duties. Further, we have the fact that even whites can and do live and are healthy in this climate. There seems only one reason why this country has not been populated generations ago by primary producers, and that is that it will not provide them with a means of livelihood. That mining will give a means of livelihood to many seems probable, and that Port Darwin might become a large naval and commercial port is also possible, as Hong-Kong has become or has been made. The land will not assist a population.

Of the places revealed by King's surveys as possible for settlement, Apsley Strait certainly seemed most suited to a naval man, but merchants knew that it was no good for their trade as there was no trepang there, and the Malays did not visit the place, yet these merchants did support the Government and try, through W. Barns, in the "Stedcomb" to make it a trading centre. Port Essington had a good trial, but Capt. Sir J. J. Gordon-Bremer's foolish land law effectively prevented this from succeeding. Raffles Bay never had a proper trial. Capt. Smyth, the first commandant, was temperamentally unsuited for the post; he looked upon himself as exiled, and let his mind continually dwell on this supposed grievance. It unfitted him for leadership. Under Capt. Barker trade was starting, and in the second year would have been better. It is reported that Capt. Barker would have refused to abandon the post when Capt. Stirling came for him and the garrison if he had had a stronger body of traders behind him, but we know that these Government settlements did not favour traders. Liverpool River was never given a trial. It seems possible that either Port Essington or Raffles Bay might have become a fairly large centre for trade if private individuals had received better treatment in land legislation, but the early history of Western Australia shows that the land legislation there was seriously interfered with by authorities in England, who were not prepared, up to 1830, to offer such conditions as were offered later at Darwin.

THE PEOPLES OF PALESTINE.*

By Lieut.-General Sir Henry Chauvel, G.C.M.G., K.C.B., Hon. Corresponding Member.

The lecture I am proposing to give, I want you to understand, is simply my own impressions of the peoples I met in Palestine, acquired during only two years' residence amongst them, and I really do not pretend to know very much about them, nor have I made any very deep study of them.

At the time we entered Palestine, in January, 1917, the population of Palestine proper, that is, west of Jordan, was estimated at 700,000. Of these, about one-seventh were Jews, one-fifth Christians of various nationalities, and the balance Mohammedans who styled themselves "Arabs."

As these latter form the bulk of the population I will deal with them first. They may be roughly divided into two classes:—The bedouins or nomads, and the settled peasantry or fellaheen.

The former are pure Arabs and only visit their land in Palestine to sow and reap their crops, returning to the desert beyond Jordan for the remainder of the year, keeping themselves more or less segregated from the settled population, though, through the generations during which this custom has prevailed, a certain number have and do become merged into the settled population. They have most of the characteristics of the desert Arabs. They are dignified, courteous, hospitable, and warlike in appearance, but are shifty, treacherous, and exceedingly poor fighters unless they have their enemy at a marked disadvantage.

The latter are not Arabs. They are Canaanites, crossed with every race that has conquered Palestine from time immemorial—Egyptians, Philistines, Jews, Assyrians, Greeks, Persians, Romans, Crusaders, and Arabs. The latter, being the last conquerors to remain in the country, have naturally left a greater mark on them than any others. There is also the constant filtration from the desert I alluded to before. These people have been oppressed and taxed to their utmost limit for generations, and are consequently lazy, shiftless fatalists, but I am confident are capable of becoming, under good legislation, as good and capable agriculturists and labourers as the Egyptian fellaheen, with whom there is much akin.

---

* Lecture delivered before the Royal Geographical Society of Australasia (Queensland) on 19th August, 1925.

Of Christians:—First of all there are the Christian peasantry, who are as much Arab as the Mohammedan fellahin and call themselves such. They are similar to the latter, with the fundamental difference that the Christians' precept is "God helps those that help themselves," whereas with the Mohammedan peasant everything that happens to him is God's will and he sits down under it. The consequence is that Christian villages are cleaner and more prosperous and the people were happier in spite of the oppression they had suffered. They are very early Christians (centuries earlier than we are), and are mostly of the Greek Orthodox Church, though there seemed to be some difference with those beyond Jordan, of whom there are several thousands. These claimed when we met them to be descendants of the Crusaders, but I learnt afterwards that they were originally inhabitants of the coast about Ascalon but dissented in the very early days of Christianity from the conception of the Trinity and fled beyond Jordan to escape persecution.

Next are the Bethlehemites (Bethlehem is practically a Christian community), who also claim, and I think with justification, to be descendants of the Crusaders. They are fairer in complexion than the peasantry and their women wear to-day the headdress of the Crusader's lady. They are nice people. The people of Nazareth are somewhat similar, but have less European blood and have not the distinctive costume.

Then there are the Franks or Europeans, in semi-religious colonies or actually in religious institutions, Germans, Russians, and French. These are settled chiefly about Jerusalem and Nazareth, with a considerable German colony distributed between Mt. Carmel and Haifa.

In some of the religious institutions the members were nearly starving when we got there, and to enable them to earn something they were given lengths of road to repair and keep in order. I was motoring down from Jerusalem to Jericho one day when I came across a party of some twenty white women in semi-religious costume working on the road under the supervision of a Sikh pioneer. I was told they were Russians, but they looked to me more like Scandinavians, so fair were they. At any rate I could not stand it and spoke to Sir Philip Chetwode about it, with the result that the party was put under a white supervisor from henceforth. It was quite common, however, to find women working on the roads, though in other cases they were natives, both Christians and Mohammedans.

Other Christians are:—Syrians (land owners or business men),

Armenians (chiefly business men or tradesmen of different sorts), and Levantines (land owners or in business). I cannot say exactly what a Levantine it, but he appeared to me to be a person born on the Asiatic shore of the Mediterranean, who claimed to be a European but who would have difficulty in proving that he was substantially of European descent.

We next come to the Jews, and I gathered that there were none who might legitimately be considered indigenous to Palestine. It was, I gathered, substantially correct that the nation was driven out of Palestine and dispersed by the Romans within the first and second centuries A.D. The only people who could by any chance come under the heading of indigenous Israelites were the few Samaritans (about 170) in Nablus (ancient Shechem), who still practise the ancient rites. These, however, are not classed as Jews.

I came across at least five different types of Jews, and I will deal with them in the order in which they returned to Palestine.

First there are the Spanish Jews, whom we came across in Hebron. They are the descendants of the Jews who fled from Spain to Palestine in or about 1492 to escape the persecutions of Ferdinand and Isabella. They are metal and glass workers and weavers, wear the same kind of clothes that they wore in biblical times, and live in a ghetto in the heart of Hebron. They are of smaller physique than the European Jew, and are darker in complexion. They do not, I understand, intermarry with the European Jews. There are others of the same type living in the Jewish quarter of the old City of Jerusalem.

Next in order are those of the foundation colonies about Jerusalem, just outside the city walls, one founded by Sir Moses Montefiore and the other by a wealthy Russian society. These colonies have apparently been founded largely with the object of keeping the religious rites going in the Holy City, and as, up to the outbreak of the late war there had been enough money to live on (with the exception of a few industries, such as brass work and lace-making, the men had done no manual labour for generations). Consequently they were very effeminate looking and of poor physique. This was added to by their costume, which consisted of a black clerical, soft felt hat and a long, rusty black coat reaching almost to their ankles, with their hair worn to their shoulders, and long beards. The women were of better physique and wore a more or less European costume. These people were mostly from Russia originally, though some were from Bokhara. The average were fair in complexion. During the war, funds from Russia ceased and

a large number of them were practically starving when we took Jerusalem. In order to ease the situation we formed a labour corps of the men, but this was not very successful, owing to the reasons I have given, and they were encouraged to expand whatever industries already existed. In the meantime they had to be fed.

The next class are the Zionists, and I have divided them into two classes: those who live in foundation colonies and those who live in independent colonies where each man owns his own farm—for the difference is great. They are all European Jews and are of similar physique and as fair in complexion as the people of the countries in which they have lived. All have come to Palestine within the last forty years, and they wear mostly European clothes. The difference is this: the purely foundation colonies are communistic and little work is done beyond growing enough for daily needs; houses, well-built originally, are falling into disrepair, and there is no progress. In the other colonies, which were settled by what I call real Zionists, that is to say, people who had come to build their homes in Palestine for religious and patriotic reasons, having in many cases made the wherewithal in other lands, progress was apparent everywhere. Their villages were delightful and so were they. I lived for four months in one of these villages and became quite attached to the people. The manner of my going there might interest you. After the Battle of Beersheba and the pursuit up the Philistine Plain, Sir Edmund Allenby had decided to press the enemy northward of the Jaffa-Jerusalem road and railway before turning eastwards into the hills to attack Jerusalem. I knew that my job was to be the holding off of the enemy to the north while the infantry moved eastwards on Jerusalem, so that on the 17th November, 1917, when my troops had taken and occupied the line I was to hold I commenced to think about establishing my headquarters in a suitable place for the command of this line. I was then at the Arab village of Yebna and the country to the north was studded with pretty Jewish villages. I had not lived in a house for nearly three years, and I sat on the hill at Yebna with my field glasses, looking for a suitable place. On a hill in the centre of the most attractive village I noticed a nice-looking white house with a flat roof, which seemed to offer facilities for visual communication with the greater part of my line. I sent off a staff officer in a motor car to see the Mayor of the village and try and acquire that house. He came back with the information that it belonged to an Australian Jew and it was mine. As a matter of fact, the house, although furnished, was empty, its owner, Mr. Slutzkin, of Flinders street, Melbourne, and his family were at Alexandria when

the war broke out and had been unable to return. I took possession at once, acquiring other houses for the rest of the staff and corps troops, so that the whole of corps headquarters were established there. We lived there for four months and, although all kinds of damage is inevitable under such circumstances, for which liberal compensation is always paid, when we left the Mayor refused to put in any claim whatever. These Jews had already won the heart of General Cox, whose brigade had driven the Turks from that area, by burying in their own cemetery those of his men who had been killed in the fighting about the village (they actually placed crosses over the graves). Our senior padre, the Rev. Maitland Woods, was the guest of the Mayor during the whole of our stay and they were very good to him. For his Christmas Day service they placed their large almond factory at his disposal and decorated it for him. The Mayor's wife also prepared the bread and provided the wine for the Communion Service.

I had an interesting experience in this village, which I think is worth telling. I took up residence there on the 17th November, 1917, and no sooner had I arrived when the Mayor and Council called on me and said they were going to invite me to a banquet when Jerusalem was taken, the Council assuming, which was perfectly correct, that our Infantry were already advancing on the Holy City. It is not generally known that our first effort more or less failed, but such was the case, and as time went on and there was no capture of Jerusalem to celebrate the villagers began to feel inhospitable. On Friday, the 7th December, the Mayor came again and said that the Council had decided not to wait for the capture of Jerusalem but to give me a banquet on the night of Sunday, the 9th December, as that was the commencement of the Feast of the Maccabees, one of the principal Jewish festivities. He also asked me to bring as many of my Staff as I wished, but particularly asked for Padre Maitland Woods, as he wished him to "bless the feast." I accepted, and this is what happened:—At noon on the ninth, Sir Philip Chetwode commanding the Twentieth Corps rang me up from somewhere in the Judæan Hills to tell me that Jerusalem had surrendered. I immediately decided to keep this information up my sleeve for my speech at the banquet, and bound over every Staff Officer and signaller in the place to silence. The banquet was a wonderful spread, especially for people who were supposed to be starving, and Maitland Woods's "grace" was a fine effort (he had been reading up the history of the Maccabees). A short religious ceremony followed, for which all the men present, except ourselves, put on their hats, and then I was asked to speak. The information

I had to impart put a new aspect altogether on to the proceedings and gave a fine field for rhetoric on the part of the local orator, who made a fine speech in Hebrew, translated as he went on by the Mayor's daughter, who spoke excellent English with a strong American accent. He detailed the circumstances of my invitation to dinner and claimed that they showed that they, my hosts, were true children of the prophets. He drew attention to the remarkable fact that the date was the anniversary, by Jewish reckoning, of the freeing of Jerusalem from the Greco-Syrian yoke by Judas Maccabæus 2,221 year ago, the raison d'être for the feast we were partaking of. He also showed that we had been fighting on the same battlefield—Beth-Horon (where my yeomanry had such a bad time), Emmaus (now Amwas), out of which General Hodgson manœuvred the enemy in November. Kirjath Gerim (now Kuryat el Enab) and Mizpah (now Nebi Samuel) was where the stiffest fighting in the whole campaign took place. He quoted many prophecies from the Bible, some of which had come off and some were still to come. Altogether we had one of the most interesting evenings I have ever spent in my life.

Last, but not least, of the Jews are the Yemenites, and they are, in my opinion, the people who are going to save Palestine. Their history is:—At the time of the Dispersion the poorer classes of Jews who could not get to other countries were driven into the desert and pressed further and further south until finally they were brought up by the Indian Ocean, settling in the Yemen, which is the northern hinterland of Aden. There they remained agriculturists and kept their religion and language to the present day. Their return to Palestine was due to the following:—About forty years ago, when the Zionist colonies were first commenced, it was soon found that the young European Jew did not take at all kindly to the land, which was quite conceivable, seeing that his fathers for generations had been forced to become merchants and middlemen through not being allowed to own land, and that the local fellaheen were not only disinclined to work for them but were dishonest to a degree. Failure seemed imminent, when one of the Zionist leaders conceived the idea of importing Jewish fellaheen from the Yemen, and in every one of the Jewish agricultural colonies of to-day you will find a small colony of Yemenites who do most of the agricultural and a good deal of the domestic labour. They are good, honest people and, though their methods are nearly as primitive, they are better farmers than the Arabs. They speak Hebrew and Arabic and are of somewhat lower stature than Europeans, and are as dark in complexion as the Arabs of Southern

Arabia, amongst whom they have lived. The European Jews look on them as a labouring class and do not intermarry with them. Their dress is similar to that of the Arabs, except that the men at that time generally wore the tar-brush or Turkish red fez cap.

I have not time to go into the peoples of further north, but there was another race we came across beyond Jordan—the Circassians. They were the descendants of Mohammedan Caucasians whose countries were taken from Turkey by Russia and who refused to live under the Czarist régime, and threw themselves on the generosity of the Sultan of Turkey. The Sultan killed two birds with one stone with these people. He settled them in colonies along the edge of the Arabian Desert from north of Aleppo to east of the head of the Dead Sea, thereby forming a buffer between the desert Arabs and the settled populations. We met them first in the vicinity of Amman and did not like them. They were treacherous and not attractive. Their women are said to be pretty, but as they were always veiled I cannot say whether this is so. They are fairer than the Arabs, but I gather are already much darker in complexion than their compatriots who have remained in the Caucasus.

THE SIGNIFICANCE OF SOME OF THE COMMON ENEMIES OF HEALTH IN OUR MIDST.*

By Dr. H. W. Tilling, Medical Officer in Charge, Unit No. 2, Hookworm Campaign.

Mr. Chairman, Ladies and Gentlemen,—

I have been requested by your Society to say a few words to this Branch, relative to the activities of the Hookworm Campaign. It is somewhat difficult for me to choose a subject that will be of interest to you. But, acting on the assumption that "All knowledge is useful," I will briefly remark about "The significance of Some of Our Ever-present Pests, with Relation to Their Responsibility in the Dissemination of Disease."

Doubtless the material will not be new to you, but by eliminating technicalities I trust that you will be able to find a few points that will interest you. I will consider my effort successful if only I can impress you with the importance of the ravages of these pests on the health of the community and the urgent necessity of their eradication or control. In the words of Abraham Lincoln, "It is the duty of every man to protect himself and those associated with him from accident."

It is acting on these sentiments that our Public Health Associations endeavour, by disseminating knowledge, to educate the public on these matters, pointing out that individual effort must be depended on to a large extent in ridding the community of these pests that are so harmful to health. On this account also, the Medical Profession is divided into three categories:—

Firstly—Those treating already-existing disease;

Secondly—Those working at the prevention of disease;

Thirdly—Those doing research work.

All these classes are essential, the first being dependent on the other two, and the second being absolutely dependent on the third.

---

* Read before the Mackay Branch of the Royal Geographical Society of Australasia (Queensland), 24th June, 1925.

Prevention is obviously better than cure, and the only way of bringing about prevention is by educating the public and making them conversant with the methods that are to be adopted to protect their own health and that of the community.

The principles for the eradication of these pests are obvious to the intelligent person, and the methods to be employed are largely common sense and may be found by reading literature on the subject or, in the more complicated cases, by obtaining information from Health Associations.

The first we will consider will be one of the comments of our household nuisances, namely the fly.

The Fly.

There are many kinds of flies in Queensland, but there are only two varieties that need be considered from the health standpoint.

The first is the common house fly (*Musca domestica*), found all over the State; and the second is a variety known as *Musca vetustissima,* found mostly in Central and Western Queensland. This latter fly is responsible for a good deal of distress and disability, in that it gives rise to eye trouble, namely trachoma and acute ophthalmia (commonly known as sandy blight, bung eye, &c.).

The ordinary house fly is a great enemy of health and is responsible for a large proportion of the preventable diseases.

About one half of the infantile mortality is due indirectly to its presence and habits.

The favourite breeding place of this pest is in rubbish or filth of any description. The eggs deposited by the female hatch very rapidly under favourable circumstances, the time of hatching, according to temperature, ranging from 8 to 12 hours. There are three larval stages, the first being from 1 to 3 days, the second 1 day, and the third from 3 to 4 days. From the egg to the adult insect requires about 10 days. The eggs are laid in batches of about 120.

A fly will lay from four to six of these batches during its lifetime. That is, each fly may be accountable for about 700 eggs. From the above it will be seen that if the breeding is unchecked one fly may be responsible for millions of progeny during a normal summer.

It is estimated that one pair, within one summer, may be accountable for 5,598,000 flies—an incredible number.

The common breeding places of the house fly are in—

Stable manure,
Closet pans not flyproof,
Garbage pans not flyproof,
Rubbish of any description,
Street sweepings,
Decaying, rotting, or fermenting material.

Diseases known to have been transmitted by the house fly include—

Typhoid Fever,
Diarrhœa,
Gastro-enteritis,
Tuberculosis,
Diphtheria.

They have also been found to contain the germs of anthrax, cholera, and plague.

This is a very formidable list, and one cannot stress too emphatically the importance of treating this pest seriously.

During the ten years in Australia, from 1913 to 1922, there were 3,968 deaths from typhoid and 25,885 deaths from infantile diarrhœa, making a total of 29,853 from these two diseases alone (nearly 30,000).

A very large proportion of these infections were due to flies, and therefore preventable. Even if only half of these were fly-carried it means that nearly 15,000 persons died needlessly—a very serious condition in Australia especially, where population is so badly needed.

It must be remembered that flies not only breed in filth but that they feed on it, and, living in it, contaminate everything they touch, thus polluting the food supplies with the filth and germs they may carry or have ingested. It may be of interest to you to know the character as the well-known "fly spot" that appears so readily on any article that flies have access to.

These spots consist of ingested material mixed with the fly's saliva.

The number of spots produced averages about thirty per day per fly.

It has been found that when infected food has been given to flies these spots contain great numbers of the infective organisms.

Those flies, which have fed on sputum, deposit a greater number of spots than others, which is significant in connection with the question of the spread of tuberculosis. The distance that flies travel from the point on which they hatch has an important bearing upon the spread of disease.

In cities, flies will quickly travel up to 700 yards from their point of origin; in the country they will travel further. The inference is that one heap of infected refuse can result in countless infected flies spreading over an area within a radius of nearly a mile in the country and about half a mile in the towns.

Flies caught in insanitary or congested areas of a city were found to carry or contain from 800,000 to 50,000,000 bacteria per fly, and those in cleaner or less congested areas from 21,000 to 100,000 bacteria per fly.

You will note a very large difference in these figures. These facts give food for reflection in dealing with the cleanliness and the overcrowding of towns.

Bugs, Fleas, and Lice:

Other household pests are bugs, fleas, and lice. Although these may influence health by lowering the resistance of the skin and make it more prone to acquire diseases, they need not be considered as ordinary disease-bearing pests.

Mention should be made that bugs have been known to carry leprosy and also that during the war it was found that trench fever was carried by these means.

Cockroaches.

Cockroaches, which breed and live in filth, and are even filthier than the flies, are capable of spreading disease by contaminating food.

Vermin.

Rats and other vermin may carry disease, more especially plague, and individual effort is required to ensure that premises are kept vermin-proof and vermin-free, so that this channel of infection is closed.

This is necessary, as plague is endemic at some of the ports at which vessels call on their way to Australia, and it is quite easy for rodents to conceal themselves in merchandise.

It is interesting to note that in Mackay, during the years from

1910 to 1924, 41,534 rodents were caught and destroyed, and taking as a mild estimate that ten to twenty exist for every one caught, it will give some idea of their large numbers.

The next common nuisance which is a menace to health we will consider is the mosquito.

Mosquitoes.

If flies and mosquitoes were completely eradicated from Queensland, many of the diseases at present causing loss of human life and economic waste would disappear and a considerable increase in comfort of living would result.

Experience in other parts of the world has proved that the control of fly and mosquito borne diseases is possible when there is adequate co-operation between citizens and the Government in the enforcement of proper means. There is no reason why Queensland should not benefit by the experience of others, and so reap the benefits sure to follow the control of flies and mosquitoes and the eradication of the diseases they cause.

Examples of this control are known to all. For example, in West Africa this district is no longer the white man's grave of old, being at present no worse than any other tropical country. Then there is the example of the Panama Canal zone, which was completely freed from mosquitoes.

A case nearer home is that of Toowoomba, which was freed from mosquitoes as the result of a local campaign.

Although all mosquitoes are troublesome in that they cause considerable irritation and discomfort, they are not all harmful.

Certain species of mosquitoes have been proved to carry disease, and it is against these that Public Health efforts are mainly directed.

As it happens, in towns and centres of population, the disease-bearing species are identical with those which mostly interfere with the general comfort.

Those mosquitoes in Australia known to carry disease are divided into two classes—the Anophelenes and the Culicines.

1. Anopehelene mosquitoes, the potential carriers of malaria. They exist over the greater part of Queensland. They breed in clean water.

   This is the variety that rests with the body perpendicular; it is black in colour, with white patches at the joints of the legs.

2. Of the culicine mosquitoes there are two well-defined disease carriers—

   (*a*) *Culex quinquefasciatus,* the filaria carrier. This species breeds in dirty water. It rests with its body horizontal and is plain brown in colour. It bites chiefly at night time.

   (*b*) The other variety is the *Stegomyia ægypti,* the carrier of yellow fever and dengue fever. As with the Anopheles, this variety breeds in clean water, but rests with its body horizontal. It is of a slate colour, with white markings, and does most of its biting in the day time.

Australia is very fortunate in having only about twenty-six varieties of mosquito, out of the hundreds known.

The diseases just mentioned above, with the exception of yellow fever, are either endemic in Australia or appear in epidemic forms at intervals.

Malaria.—At present malaria concerns mainly the North and North-West of Queensland, but in the absence of efficient control this disease may easily become more widely spread, as is proved by the introduction into certain northern towns in 1910 of malignant malaria from New Guinea.

Filariasis.—Infection with filaria is endemic in Queensland. Investigations by the Hookworm Campaign show that about 5 per cent. of all the people of Brisbane are infected with this disease.

Dengue Fever becomes practically pandemic at each visitation, and results in great dislocation of business.

Yellow Fever has not yet arrived in Australia, though it has spread from its centre in the West Indies to North America, Spain, Portugal, and Italy, and even Great Britain.

Australia's immunity is due to our distance from the endemic centres and to the control of shipping, but with the opening of the Panama Canal the introduction of yellow fever into Australia becomes possible, and since the danger of its introduction exists it would seem wise to provide against its spread by the destruction of its carrier.

It is interesting to note that the first adult filaria was found in Australia (Queensland) by Dr. Bancroft in 1876, and it was named after him the *Filaria bancrofti.* This is apparently the only filaria found in man in Australia.

Knowing the dangers caused by the mosquito, it is the common

duty of every citizen to wage war on them, never permitting stagnant water to remain on or around premises under his control, and cheerfully to carry into effect regulations, however irksome, having for their object the prevention of disease.

We will now mention some of the habits of the domestic mosquito:—

It is only the female mosquito which sucks blood. In this respect they differ from the flea, both the male and the female of which live on blood.

Both sexes of the mosquito will thrust their proboscides into various substances, and as far as the domestic species is concerned the filthier the substance the more it is enjoyed.

The fecundated female requires blood for the maturation of her ova.

As soon as the female has mated she develops a sudden craving for animal blood.

She lays her eggs in batches.

After mating and after some meals of blood, the female returns to water to oviput.

The domestic variety prefers dirty water on which to lay her eggs.

She lays them in rafts of about 300 at a time.

The Anophelines lay their eggs singly.

The egg rafts of the Culex are about one-eighth of an inch in length, and can readily be seen floating on the surface of the water.

The eggs of the Stegomyia merely cling together and are difficult to see with the naked eye.

The domestic mosquito likes to lay her eggs on the surface of dirty water, for she knows that this will supply plenty of food for the young when they are hatched from the egg and become "wrigglers."

Each separate egg gives rise to one larva or wriggler, therefore each egg raft produces a brood of swimming larvæ. The larva spends at least ten days on the water before it emerges into the air as a full-grown insect. During this time it grows much bigger and undergoes four moults. For the last twenty-four hours prior to its birth into the world as a flying insect it is found in the "comma

like'' stage, known as the pupa or nymph. During this stage it bobs about in the water, breathing at the surface, but it takes no food. As soon as the larva has left the egg and becomes a swimming wriggler its first trouble is to find food. If it finds this and the water is warm it grows rapidly, moulting its skin every two or three days, until at the end of the tenth day it enters the pupa stage, after having shed its skin for the last time.

Both pupa and larva are not fish, but insects. They must breathe the air from the atmosphere.

The larva has a tube at the end of its tail, which it thrusts through the surface of the water and so breathes. The pupa has short tubes on its back through which it obtains air. After taking a breath of air, the larva goes down again to feed. On its head are two swirling circulatory organs which direct the food toward the mouth.

As has been mentioned, the pupa does not feed.

The pupa stage lasts in hot weather for about twenty-four hours, but this may be prolonged if the water is cold. During this stage the winged insect is gradually forming within the pupa skin. While the pupa is resting on the surface of the water the skin splits where it meets the surface, and through this split the head, antennæ, and proboscis of the mature flying mosquito emerge above the water, the rest of the body gradually coming out.

For half-an-hour or so the partly hatched mosquito remains floating on the old pupa case from which it is in process of being born.

The wings are gently separated and carefully dried, and ultimately the new mosquito flies away.

If during this process there comes a gust of wind or the water is disturbed in any way, the mosquito will be drowned.

If there is not enough food for the 300 or so larvæ from the raft, they will kill each other, and only the strongest or luckiest will survive.

Male mosquitoes live only a few hours or, at the most, two or three days.

In common with the silkworm moths, their lives are just sufficient to ensure the perpetuation of the species.

I will not touch on the methods of eradication of this pest but, needless to say, the efforts are directed against the mosquito whilst in the larval stage, as during this period it is very easily killed and more or less easily controlled.

Before leaving the matter I should like to mention that experiments are being made with fish in regard to larvæ destruction.

The following Australian fish have been found to be larvæ-eating:—

Crimson-spotted sun fish (*Melanotænia nigrans*).
Fire-tailed gudgeon (*Carassiops galii*),
Carp gudgeon (*Carassiops compressus*),
Green perchlet (*Priopis olivaceous*),
Trout gudgeon (*Mogurnda mogurnda* var. *adspersus*), and
Blue eye (*Pseudomugil signifer*).

The control by the use of fish is, of course, limited to those species of mosquitoes which breed in clean water. The next menace to health to which we will refer is of a different type to those already mentioned, it being an internal parasite of man.

Hookworm.

I refer now to the hookworm, on the control of which there has been a considerable amount of work done in the last few years, with very gratifying results.

Most of you will be conversant with this subject, but it will not be out of place to recapitulate a few of the items illustrating the significance of this parasite, and so refresh your memory.

This parasite, whose technical name is the *Anchlostomum duodenale* or the *Necator americanus,* is so called from the presence of hooklets in its mouth by which it grips its host.

It is a common scourge in most of the warmer countries of the world.

As the ova require both warmth and moisture in the atmosphere for their maturation, the intensity of the infection will be found to depend on the rainfall.

Areas with a rainfall of 40 in. a year or less are comparatively free, while areas with a greater rainfall than this are liable to have an infection rate progressing with the increase of moisture.

Hookworm disease was first brought into prominence in Europe when the St. Gothard tunnel was being excavated. It was discovered that the miners were becoming infected with the parasite, with great economic loss. The condition was known as "miners' anæmia."

Since that time the condition has been demonstrated in nearly all the warm countries of the world.

Some years ago it was found to be so prevalent in the coastal belt of Queensland that steps were taken to control its incidence by the formation of a Campaign. This big organised fight against disease is called the Hookworm Campaign, and is carried on jointly by the Commonwealth Health Department and the several States and Territories.

The following facts about the effects of hookworm disease will convince you of the importance of this organised fight:—

Effects.—Apart from the usual symptoms and signs of illness hookworm disease has a very serious effect upon those harbouring these parasites.

The disease, unlike smallpox, plague, or cholera, is not spectacular in its advent, but quietly and subtly comes upon a people even without their conscious appreciation. It produces mental deficiency, physical decay, poverty, and economic inefficiency, the birth rate is lessened and the death rate is increased, other diseases are fostered by the decrease of individual resistance and vitality dependent upon the infection.

It cannot be gainsaid that a sick person is a liability to the family, to the community, and to the State.

A great many people are so lightly infected by the parasites that they do not realise any actual depreciation in health or physical status.

These mildly infected cases demand careful attention as they are the unconscious carriers of the disease and may serve to maintain the great incidence of hookworm disease. Hookworm disease saps the strength by such imperceptible stages that usually the patient himself does not sense the change of his physical condition, from day to day, until the powers of resistance eventually become so lowered that the germs of tuberculosis or of some acute infectious disease find favourable lodgment and all too frequently a fatal outcome results.

In parts of Australia it has gained a foothold and would spread if uncontrolled. Fortunately it is now clearly recognised that the disease is entirely preventable.

In army records it is indicated that resistance to disease is lowest and the mortality rates highest among the organisation in which hookworm disease is prevalent. Without doubt, hookworm disease has a deterrent effect upon the birth rate.

One of the most startling effects of this malady is that upon the development of children.

During 1918 a thorough investigation was made of the mental retardation due to hookworm disease among the school children of Queensland. Lightly infected cases had, on an average, a retardation of 9·3 months in their mental development, as measured by the Simon-Binet method, and the heavily infected cases showed a mental retardation of 23·4 months.

The longer the infection had persisted in the child the greater was the effect upon the mental progress. In extreme cases of infection a retardation of mental development to the extent of 5 years was recorded. The retardation of mental development as a result of hookworm disease is not only discernible in children, but has been plainly noted in the adult.

Army records covering 10,000 troops showed that the mentality of white men with hookworm disease was about one-third below the mentality of those not affected.

In one women's college in an infected area the average standing of fifty-six infected students was 78 per cent., whereas fifty-six students free from infection averaged 89 per cent., a difference of 11 per cent.

Teachers everywhere are practically unanimous in reporting that the treatment of infected pupils results not only in marked gains of weight and physical appearance but in a decided improvement in zeal and intelligence is noted.

From this brief resumé it will be noted that hookworm disease is a real menace; that its ill effects are physical, mental, and economic; that the treatment of this disease results in marked benefits to the individual, to the community, and to the State.

There are three important phases to the work of hookworm control:—

Firstly—Education and publicity to gain the co-operation of the people and to impress upon them the importance of the project.

Secondly—Treatment of the infected.

Thirdly—Prevention of reinfection by cessation of soil pollution by means of sanitation.

Before leaving the subject, I should like to mention that the

latest method for the examination of specimens for hookworm ova was elaborated by a member of the Hookworm Staff, namely, Dr. H. H. Willis. This method is known as the Willis Salt Flotation Method, and it is now in universal use.

I will just give a few figures to show the good work done by the Campaign since its inauguration.

During the original survey, from October, 1919, to December, 1922, 248,721 persons were examined, of whom 48,256, or 19·4 per cent., were found to be infected.

In Queensland, 48·5 per cent., or nearly half of the children between 6 and 18 years of age, were found to be infected.

During the permanent control work in 1923 and 1924, 124,013 persons were examined and 9,190, or 7·4 per cent., were found to be infected, and 289,948 treatments were given.

From the commencement, 356,336 treatments have been given; not less than 50 per cent. of these were proved to be complete cures.

To give you some idea of the decrease in infection rate due to control methods, I will take the figures from a typical area, for example, Cardwell.

In this area during the 1919 survey 51·4 per cent. were found to be infected; in 1920 it was reduced to 30·2 per cent., in 1923, to 24·2 per cent.; and the last survey in 1924 found the rate to 12 per cent., *i.e.*, 39·4 per cent. reduction in five years.

Or take the figures from your own city. In 1919, 9·0 per cent. of the inhabitants were infected; in 1922, 4·2 per cent.; in 1924, only 2·1 per cent. This means that the number of infected persons was reduced from 500 to 80.

During this time the Campaign also undertook the malaria and filaria survey of Australia, examining 23,971 blood specimens, and of these 423 were found positive to infection.

I trust that these few words will have convinced you that these pests are a very real menace to the health of the individual and to the welfare of the community and the State, and that all measures for their control or eradication should unhesitatingly be proceeded with.

[This address was illustrated by lantern slides.]

DISCOVERY AND HISTORY OF MACKAY, QUEENSLAND.*

By A. M. M. Galletly.

Wireless communication is considered one of the latest wonders of the world, yet I must confess that my imagination has been captured by a wireless message transmitted in this land 155 years ago, which, passing through the air, was undoubtedly the most important intimation in the history of Australia.

On 31st May, 1770, a column of smoke rose into the air at Broadsound—the day before, smoke had been seen further south—then a spiral wreathed its way up from Mount Funnell, which was followed by others on the coast, at Sarina Inlet, the Mackay beach, Mount Bassett, Slade Point, and further north. Through the still air floated significant coo-eys which seemed to convey a warning of something more than ordinary. The natives on the coast and on the ranges of a truth could say there was something in the wind. Simultaneously with this sense of foreboding there appeared on the horizon a tiny speck upon the ocean, which, as it came nearer, proved to be a craft such as had never before been seen. She stood in close to the coast, and as she slowly passed on north there were intent observers both on board and on land, each watching the other. Instantly fires were lit and the smoke signals were received at Cape Hillsborough, and so the word passed on.

That craft was the "Endeavour," with Captain Cook on board, and for the first time Britishers were looking upon the beaches and the hills so familiar to us around Mackay. The "Endeavour," by a freak of the wind, had been blown off her course when looking for Tasmania, after circumnavigating New Zealand, and so struck the east coast of Australia near Botany Bay. That bold navigator, Captain Cook, followed up his discovery by exploring the coast; and so the smoke signals passed from Point Hicks to Cape York.

To the startled natives the message was a warning of the approach of something unknown and to be feared. In actual fact it was the intimation that the dark benighted days of savagery were coming to an end; that civilisation had at last reached the

* Address delivered before the Mackay Branch of the Royal Geographical Society of Australasia (Queensland), 29th September, 1925.

mysterious, unknown land of Australia; and that the largest island continent in the world had been discovered and claimed as part of the British Empire.

Referring to our own part of the coast, Captain Cook wrote:—"The Main Land is here pretty much diversified with Mountains, Hills, plains and Vallies, and seem'd to be tollerably Cloathed with Wood and Verdure."

The numerous inland explorations which opened up this land for development is a story of which Australia may well be proud. Those intrepid pioneers displayed in the highest degree the qualities of human endurance, fortitude, and sacrifice, and we owe our possessions to-day to those men of honoured memory because of what they accomplished. To-night, however, we are confining ourselves to the history of our own district, and therefore we are principally concerned with one who holds a worthy place on that Scroll of Fame—I refer to our godfather, Captain John Mackay, who, blazing a track over the range, discovered the fertile valley of the Pioneer River and placed us on the map of Australia.

In 1854 Rockhampton was the most northerly settlement, and, north from there, stations were gradually being extended. In 1845 Leichhardt made his famous journey from Moreton Bay to Port Essington, in the extreme north. Gregory, returning from the Gulf country, touched Leichhardt's track and continued south to Connor and Fitz's station on the Dawson River. Port Denison, now known as Bowen, was discovered by Captain Sinclair and James Gordon in 1859.

I mention these discoveries and the dates because they had a bearing on the discovery of Mackay. A great deal of interest was excited by the stories of the wonderful North, that land of promise, of which so little really was known. The settlement which had taken place together with the discovery of the fine harbour at Bowen offered tempting prospects of development of the land behind the Range. In a miners' camp at the gold diggings on the Rocky River, near Armidale, the topic was often discussed. It was in this environment that the idea of an expedition found its birth. The rewards for such an undertaking were indefinite. The only thing definite was the danger and the adventure of the journey, and no doubt that was why they decided to attempt it. One of the miners was Captain John Mackay, a native of Bonar Bridge, in the County of Sutherland, Scotland. He had received a good education, had a splendid knowledge of navigation and

nautical astronomy; he was a proved courageous, big-hearted leader of men, and was unanimously appointed the head of the expedition.

The journey to Rockhampton was made via Tenterfield, Warwick, and Gladstone. At Rockhampton the equipment was obtained, and with twenty-eight horses the trip began in earnest. The party consisted of Captain Mackay, John Macrossan, H. Robinson, A. Murray, John Barber, and Duke (an aboriginal). On 22nd March, 1860, they left Marlborough, and bade farewell to civilisation, and camped that night at the foot of the range. When preparing the evening meal they were startled by the approach of a dozen aboriginals, apparently with hostile intentions, but a shot fired over their heads caused the natives to bolt. Ascending the Range, from the top of which a magnificent view of Broadsound and the islands at sea is obtained, they continued westward till they came to the Isaacs River. They were followed by natives nearly every day, and a careful watch had to be kept at night. On one occasion they came upon a party of aboriginals, consisting of an old man, his gin, and three piccaninnies. The man bolted and left his family behind. The gin hugged her children in fear and trembling, but Macrossan gave her cotton and needles, showing her how to use them. Then he dropped a white shirt over her. No doubt the gallant husband was agreeably surprised at the safe return of his better half, clad in white robes, and it might have been an added consolation, had he known, that as far as the length of her skirt was concerned she was conforming to the dictates of fashion in 1925.

Mackay travelled as far as the junction of the Burdekin and Suttor rivers, where he found that a number of trees were marked "D," indicating that Dalrymple had been before him and had taken up a block there. This must have been a great disappointment, and on 10th April it was decided to turn back, but to keep more to the eastward as they went south. On 16th May they came to the Range, and climbing to the top they found themselves gazing upon an immense tract of level country, extending to the seaboard, and thus was the valley of the Pioneer River seen for the first time by white men. One can imagine their thrill of well-deserved satisfaction, after their previous disappointment, as they realised they had discovered a new area and an unknown river, where no one had forestalled them. Next day they descended with great difficulty.

A careful study of the map in conjunction with the Captain's

diary would make it appear that they crossed the Range a little south of Eungella. At 10 p.m. they camped on the bank of Cattle Creek, and on the following night at the junction of the Pioneer with Cattle Creek. The next night they camped where McGregor Creek joins the Pioneer. I have no definite authority in naming these camps, and am open to correction. On 20th May, two days later, they reached what is now known as "The Lagoons," and so exhausted were they that they unsaddled and slept in the long grass, regardless of danger. In the morning they moved up the river, where they could camp with more safety and there they stayed a week, extending their explorations as far as the mouth of the river, where they made the latitude.

Macrossan and Barber discovered the mouth of Baker's Creek.

At this stage serious trouble befell the party, and I am sorry time will not permit me to give a detailed account of their experiences. The natives were drawing closer around them and becoming more aggressive; food became very short; the weather was cold and wet; and worst of all, some of the men got fever. They subsisted on 'possums, iguanas, and were lucky when they got an occasional turkey and once a kangaroo. With difficulty they packed up and began the return journey, and marked the trees to indicate the blocks for which application would be made when they got home. So ill and weak were they that no precautions could be taken for safety. Sometimes they camped for a few days until they had regained sufficient strength to continue. Duke (the black boy) fell from his horse and died. He was buried where he lay. In dire straits the party got over the Range and turned southwards for home. On 2nd July, to their great relief, they came across the tracks of a dray and the trail of a herd of cattle. Following this, they arrived at midnight at the camp of Mr. Dan Conner, where he was forming Collaroy Station. A week later they reached Rockhampton, jaded, physical wrecks, after an absence of nearly four months.

Landsborough formed Fort Cooper Station in 1861, and Reynolds built the first hotel at Nebo in 1862. Mount Spencer Station was formed in the same year by Richard Spencer. Also in that year Captain Mackay returned with 1,200 head of cattle and crossed the Range near the head of Denison Creek and settled at Greenmount.

The Captain arranged for the "Presto" to bring his supplies

from Rockhampton. This was the first vessel to enter the Pioneer River, and it went as far as that spot where Landsdowne now is, above the hospital bridge.

The "Presto" had brought stores for Spencer as well as Mackay, therefore the two settlers, together with a black boy, set out to look for a more convenient track across the Range and blazed what is now the present road to Nebo. Captain Mackay detained the "Presto" and in her made a survey of the river. His sketch was subsequently incorporated in Buxton's map of Queensland, and incidentally Mackay was declared a port of entry at no expense to the Government.

One of the first vessels to follow the "Presto" was the "Louisa Maria" under Captain Garcia, father of the late Mrs. Charles Webster. Mr. Robert Fleming and Mr. G. Voysey arrived on 31st January, 1863. The following month, by the s.s. "Murray," arrived Messrs. Alex. Shields, K. H. Wills (of Wills's Hotel), Chas. Keeley, Wm. Bagley, and Wm. Landells. In 1865 "The Three Friends," a vessel owned by Seaward Marsh and Genge, made regular trips up the river from Bowen. The post office was opened in January, 1863, and in July arrangements were made for a telegraph line from St. Lawrence, via Collaroy, Henry Bell's at Plane Creek, thence from Greenmount to Bowen, with a branch line from Greenmount to Mackay.

Regarding the first residents of the town, I quote from Captain Mackay when writing to Mr. Ling Roth. He says:— "There were no houses at Mackay when I left, but a Mr. Cridland from Fort Cooper and a Mr. Arthur Henderson (subsequently of Beaconsfield) intended building. James Ready, who came out with Spencer, was the next to follow. So in reply to the often-discussed question 'who were the first to settle at the town of Mackay?' I have no hesitation in designating these gentlemen as the fathers of the hamlet. Mrs. Ready was the first white woman north of Broadsound Range, and many of the old fever-stricken pioneers, since scattered far and wide, must to the last retain grateful memories of her kind attentions while presiding at Spencer's Camp."

Mrs. P. M. Hynes was the first child born in the Mackay district. The Hon. D. H. Dalrymple was the first Mayor. W. Purves was the first Town Clerk. Frank Kinchant was the first man to be married. The first sale of Mackay land was held at Bowen on 1st July, 1864. The Australian Joint Stock Bank was

the first to open. The hold-up of that bank is a story worthy of Rolf Boldrewood, and incidentally the late Mr. J. C. Binney took an active part in the attempt to overtake the robbers.

A sketch plan of the township in 1866 shows that Sydney street comprised the following shops:—On the East side: R. Fleming, blacksmith. On the present site: Mrs. Cook's Royal Hotel, where Wills's Hotel now stands; P. McKenney, saddler; J. Allen's store; and A. Kemmis's store. On the western side of the street: Mrs. Alderson's boarding-house stood on the site of Marsh and Webster's corner; on the Palace Hotel corner was Goldring's store; then D. H. Dalrymple, chemist; Jack O'Reilly's hotel; and lastly, W. Landells, butcher. The A.J.S. Bank was in North street, and nearly opposite was the "Daily Mercury" office. Our well-known paper made its first appearance in 1866. The post office was erected where previously a turkey's nest had been the predominant landmark. A gully crossed Wood street and Sydney street, near the Commercial Bank, and joined the river at the end of Brisbane street. Behind Marsh and Webster's corner was a devil-devil flat, on which no buildings are shown. The city to-day covers an area of 8 square miles; it has 32 miles of streets. The population is 6,500, and including the district is 18,000. To-day we enjoy the conveniences of water supply, gas, electric light, and municipal rates.

The requirements of residents are catered for by numerous business houses occupying commodious and modern premises; the financial needs are provided by seven banks; the spiritual welfare is under the care of four churches; twenty-six hotels offer rest and refreshment to the weary and the thirsty; seven doctors, four chemists, four dentists, and hospitals with a total of 169 beds are available for the sick and the afflicted; and in addition a splendid ambulance service with five cars in town and three in the country gives prompt relief. A school of arts, which has celebrated its jubilee, with its reading-room and library of 6,000 books, invites those so inclined; two large parks and gardens make pleasant recreation; 1,743 scholars attend the schools; and a fire brigade with motor power is ready for the protection of property. The law is maintained by a fine police force and expounded by four solicitors in a court house of imposing dimensions. A service of magnificent steamers, together with the Railway Department, convey thousands of passengers each week north and south, while the agricultural lines to Eton, Netherdale, Owen's Creek, and

Kungurri are worked to full capacity with the transit of passengers, goods, and sugar, and the new railway station has the distinction of having the longest platform in the State.

The objective Captain Mackay had in mind in his explorations was to find suitable land for flocks and herds, and had no more than this been accomplished it is probable that the importance of the town of Mackay would have remained on a par with that of Nebo. It was fortunate that John Spiller came to Mackay. He had formerly resided in Java, where he studied the cultivation and manufacture of sugar. From Java he took to Melbourne 30,000 plants, which arrived much the worse of the long journey, but he arranged to have them planted at Cleveland near Brisbane. When tramping over the North Side with his Javanese boy he was struck with the rich land covered with grass 12 ft. high, which suggested at once to his mind that it might successfully grow sugar-cane. The crop at Cleveland provided his requirements, and on 1st June, 1865, he planted the first cane on the North Side. T. H. Fitzgerald got half the crop Spiller grew, and planted that where Wilson, Hart's timber yard now stands. In June, 1867, Spiller erected a wooden mill, and with a horse he conducted the first crushing in Mackay. He boiled the juice in an ordinary copper boiler and produced in triumph a few pounds of sugar. In the meantime J. E. Davidson was in partnership with Fitzgerald, and they built an iron mill at Alexandra in 1868. The crop at Alexandra produced 110 tons, and the sugar industry had come to Mackay to stay. In 1867 six mills were at work, with an area of 2,000 acres under cane. The following year twenty-eight mills were in operation, with 5,000 acres. In 1879 a boom in sugar lands took place, and Mackay became established as "Sugaropolis." To-day seven mills are in the district, with a crushing capacity of 600,000 tons.

A comparative statement of sugar production in Mackay indicates the steady growth :—

	Tons.	
1868	110	
1880	7,000	
1890	20,000	
1900	20,000	(drought)
1910	53,000	
1920	35,000	(drought)
1924	66,000	

In 1925, 80,000 tons was the estimated production, but owing to the delay caused by strikes it will be impossible to crush the

whole of the crop. There is no time to mention the phases through which the sugar industry has passed, but it must suffice to say that black labour was abolished and Queensland is the only country in the world that produces sugar entirely by white labour.

There are many topics to which I have made no reference in this lecture, but my time has expired. I cannot conclude, however, without paying a tribute to the memory of Captain John Mackay, his brave band, to the black boy Duke, who died, and to the sturdy pioneers who came to this district in the early sixties, and by their courage and enterprise gave us the noble heritage of Mackay and the fertile lands around it. Nothing, I feel sure, would have gratified those brave souls more, could they have foreseen that the town and district which they developed would have taken such a creditable part in what was done by Australia during the dark years of war, when men, money, and sacrifice were required from the whole of the British Empire.

A LION HUNTING EXPEDITION IN CENTRAL AFRICA.*

By Capt. Arnold Wienholt, D.S.O., M.C., *Fellow.*

Dr. Taylor, Ladies, and Gentlemen,—

After reading the card advertising this meeting, I must first remind you to-night of that old saying, "Amidst blind men, a one-eyed man is king," for I see, in a country like Australia, where we have, perhaps very luckily, none of the greater carnivora and other dangerous animals, how easy it is to gain quite an undeserved reputation as a hunter and traveller.

If it had been my object to take my audience in imagination for a trip to try merely to hunt and shoot lions, I would have suggested our going rather to East Africa: perhaps to somewhere near the famous Athi Plains, in the beautiful Kenya Colony. There one would no doubt hear, and with luck see, more lions and certainly far more game than in the dry and comparatively poor district which I shall try and, as in my former lecture, to again describe to you to-night. But in that part of East Africa that I have mentioned, delightful though it is, we should still be comparatively close to civilisation; could, perhaps, even have gone to our camp—in a day or so's travel by car; and I think it is in some ways more interesting to make for a still very out-of-the-way district: a district which, though in it we may with luck both see and shoot a lion or two, will have perhaps as its greatest attraction the fact of our having as companions those excellent trackers and hunters, my shy little friends, the Maquengo bushmen—a race still in the most primitive state of civilisation.

On reaching Livingstone in April last year I found that the country had experienced the heaviest and longest wet season on record. As the Zambesi was in unusually high flood, the Victoria Falls were indeed a magnificent and awesome sight. Also, owing to the height of the river, our usual track to Sesheke was impassable, and we had to make a considerable detour round by the Machili River, our first stage consisting of about ten days' travelling instead of the usual six or seven.

We left Livingstone with about forty porters and my two

* Address delivered before the Royal Geographical Society of Australasia (Queensland), 27th May, 1926.

personal boys, Nashou and Musunga. The latter did not last very long, being sent home sick after reaching the Quando, but Nashou proved an excellent servant. He was our right-hand man all through the trip, and joined in every lion hunt.

At Livingstone we had picked up our salted pony, "Punch"; he had been left there with a friend after our 1923 trip. With the party came also three blue Australian cattle dogs. These latter, besides being great company for me on the trip and valuable watch dogs in camp at night, are invaluable for a wounded lion in thick country, for they are able to locate him there and give their master warning and advice as to the beast's whereabouts.

Having reached Sesheke, it was necessary, as had been agreed, to pay off all our porters, though a few of them were re-engaged for a further term. Being unable to secure sufficient carriers to carry all our loads, we went up the Zambesi by boat as far as Katimo Molilo, the pony being sent overland to meet us there.

Every inhabitant of the Barotse villages on or near the great river was busily employed catching fish in ingenious traps out on the flooded flats. These fish the natives cured by cutting them open and drying them on wooden platforms in the sun.

At Katimo Molilo, where there are many villages in the neighbourhood, we soon secured enough carriers for our goods, and with these we started on the next stage of our trip—the eight days' travelling across the dry sand veldt between the Zambesi and Quando or Marshi Rivers. As a rule, water is by no means plentiful on this route, and generally there is a 30 miles dry stage of heavy sand for the last day's march before reaching the Quando; but this year, after such an abnormal wet season, water was plentiful even in the small and generally dry pans, whilst geese and ducks and other waterfowl were plentiful on the bigger vleys.

As expected, we found the Quando River also in very high flood, and travelled up it for two days to the village of a little old induna, named Sambarra, whom I knew well. This was a very intelligent native, who had a great reputation as what Johnson called "a big gun witch doctor."

We found Sambarra's village had been flooded out, with his huts still to be seen isolated in the flood waters; his people had therefore formed a temporary settlement on the higher sand country.

From Sambarra I heard that some black Portuguese troops had been raiding the Mambokushu villages about three days to the north,

on the Luiyanna River. This had so frightened Sambarra and the other natives that they had left their former homes and cultivation on the Portuguese side. Sambarra told me that all the Mambokushu anywhere near the Luiyanna had also fled south.

This news frightened all my porters from Sesheke and Katimo Molili and therefore, as they would be of no use in that state of mind, they were paid off and sent home in a body. For two days we reconnoitred the flooded river in canoes, trying to find the best place to swim the pony across. We also took the opportunity to buy some necessary grain and flour from the local native women.

During the latter purchases we took good care that all Sambarra's young men whom we hoped to induce to act as porters for us were given every chance to notice our supply of trade blankets, calico, and other things dear to the native heart.

One afternoon I made a trip across the river to see Ben Johnson's old homestead, and to put a little memorial plate on a tree nearby. Poor Johnson, towards the end of 1923, living out there alone, had become very despondent, and this depression getting too firm a hold on him, he had, after shooting all his live stock and burning his hut and all his goods, committed suicide.

I felt, when fastening the little tablet to a big tree alongside the Quando, that to the words "Ben Johnson, erected by friends" there might suitably have been added the words on the grave of the late E. J. Banfield on Dunk Island:—

> "If a man does not step with his companions, it may be that he hears another drummer. Let him step to the music that he hears."

Having found a reasonably practical place to swim the pony across the flooded river, we made a start.

By this time, too, all Sambarra's young men, about fifteen all told, had volunteered to come with me. Our plan was to cross the river and make our head hunting-camp at some suitable pan about a week's travel west of the Quando. From there we would hunt in various directions during the winter months.

It took us one good long day to get all our expedition across the Quando. When all the party had crossed, Sambarra's canoes and paddlers returned to their own side, and we made camp on the abandoned Portuguese bank.

As the sun went down and the light faded on the flooded stretches of the river I began to experience, I think for the first

time in Africa, a feeling of loneliness. As we had over thirty loads, and my carriers all told mustered only fifteen including piccaninnies, we had to make some plan of campaign for the following morning. I decided to leave the bigger half of my loads at the river camp with Musunga and one other youngster, whilst the rest of the party went westwards till we found where we could form a temporary camp at some suitable water, and where I could shoot some now badly needed meat. From there on the following day I could send back all my natives to bring up Musunga and the balance of our loads from the depôt on the Quando.

Just before daylight a solitary lion started roaring on the high sand ridge at the back of Johnson's old homestead, and, coming in our direction, continued his concert till just after daylight.

I overhead my boy, Nashou, suggest to Musunga that it was no doubt Kapitulo (Johnson) himself coming to see us—a pleasantry that Musunga, who, unlike Nashou, had to remain at that camp, received with a somewhat sickly smile; for like all Central African natives, he no doubt firmly believed that any man-eating lion or leopard was always the spirit of some departed person.

It is curious how widely this "were wolf" idea is held by all raw natives in Africa. In the East African campaign we had a very unpleasant experience of a man-eating leopard, which came into our scouts' camp three times in one night, attacking and badly mauling first my white companion, then an askari, and finally my neapara (head porter).

From the local natives' reports this particular leopard must have killed a great number of natives, principally women and children, in the course of its long career, during which it held the whole Medo district of Portuguese East Africa in a state of terror. This particular man-eater was universally believed by all those natives to be a reincarnation of a certain well-known Jumbe (head man), Nabom.

Next morning, after about 8 miles' travelling through fairly thick bush, we made camp at a small pan. We had as guide one of Sambarra's young men named Yangana. Yangana told me that, if still there, we might find a number of Mambokushu refugees from the Luiyanna about 15 miles to the north-west, camped at some sand-pits. Therefore at daylight the following morning, with Yangana and my Marosie horse boy, Mandika, we set off in search of these people, the carriers having, as previously arranged, been sent back to fetch Musunga and balance of the loads from the river.

About mid-day I rode into a big village of Mambokushu. On seeing us the women and children started to bolt, but when Yangana and Mandika called out my native name "Suruma Tauw" ("The man whom the lion bit"), they stopped, and the headmen with their followers came up and saluted.

All, of course, knew of me, and some had previously seen me, too. I told the headman how we were situated, and that I needed as many men as possible to carry loads for me from my present camp to where I would make my hunting headquarters in the interior.

About twenty of the savages volunteered to come with me, and we reached our camp that evening just after dark.

With these extra carriers we were thus enabled to go on another five days' march westward to a pan named Kékoro, previously unknown to me. There I decided to make our head camp. Sambarra's young men were paid off and went home, Yangana taking back a good present of a khaki coat, shirt, and zazeeba for his headman, the little old induna Sambarra, without whose help I might have been in difficulties.

All my Mambokushu porters were also sent home suitably rewarded.

After such an unusually wet season the country around Kékoro was covered with long grass, still too green to burn. Till some of the country could be burnt I knew it would be hard to keep the camp in meat; and it was particularly necessary to secure sufficient meat to feed my little camp, as I could see there was going to be great difficulty that year in securing any grain from the natives on account of their having mostly abandoned their villages and gone into the bush.

I knew we should do little successful hunting without some bushmen, but in a few days odd ones began to pay me visits. From them I could fix the whereabouts of our camp, which was, as I had roughly estimated, about three short days west from my former camp in 1923, at the Gaigai Pans.

We soon had three or four excellent young bushmen as hunters and trackers, and with their help shooting first a couple of beautiful sable antelope, we were always able to just keep our camp supplied with meat till the time came to return in September.

Whilst I was busy hunting with the bushmen, my personal boys and two or three Marosie porters began to get the camp

in order, making a bough shed for the stores and a lion-proof stable of long upright poles for the pony; also some grass huts for themselves.

About every three weeks two or three Marosie would start in relays to get my mail and other articles from Seskeke.

These mail boys used to take about thirty days for the round trip there and back, so we always had several mail parties on the road at one time.

As there proved to be but little game and few lions around Kékoro, we decided after about a month to shift over to another pan called Sha-neemai, a long day to the south. Sha-neemai means "lion-water," or let us say more poetically, "Where the lions come to drink." I had heard about this pan from bushmen on my previous trip, but had never yet paid it a visit. Some years previously there had been a village of Mambokushu at Sha-neemai, which, I fancy, is a good permanent pan of water. I therefore asked a Mambokushu who had lived at the village mentioned, if when they had had their home at Sha-neemai they had found lions plentiful there. His reply was to the point:—"Why was it so named?" Then in true native style, trying to please me, he informed me that at the end of the dry season, when all the small pans were dry, you would "see every morning where the lions had been lying under the trees around the water." Still warming to his subject, he told us that the lions had killed so many of their cattle they had to send the balance of their little herd away. Lastly, out came his masterpiece, "that owing to the noise of the lions roaring they could hardly ever sleep at night." Though the result of our hunting at Sha-neemai hardly proved equal to such a glowing description, yet we did hear lions fairly frequently whilst camped there, and were lucky enough to get a couple of big males there, one a very large fellow measuring, with a little stretching (both literally and figuratively) over 10 ft., and carrying a fine mane. Perhaps if we had been able to stop another month or six weeks at Sha-neemai we might have done better.

From time to time small parties of bushmen would pay the camp a visit, stopping generally one night, or sometimes longer. I always fed them whilst in my camp, and these visitors would, of course, come out hunting with me and my own bushmen.

The strange bushmen always took away something acceptable in the way of heads, necks, or bones, from which the meat had been cut to make biltong. Quite a number of Mambukushu also came

to ask for meat, for, as they had abandoned their own homes near the Luiyanna and were trying to exist on wild fruits and roots, they were mostly verging on actual starvation.

These people gratefully took, cooked, and ate every scrap of zebra and buck hide given them, and owing to this "hunger" throughout the district, I shot a few more game than I would have done for my own little camp only.

Picking up every day a little more Siquengo (language of the Maquengo bushmen) one was enabled to continue the study of these little people, 20,000 years behind us in civilisation.

The bushmen are not very talkative with a strange white man,

TWO LIONS GOT ONE MORNING AT SHA-NEEMAI PAN.

"PERSONAL BOY" NASHOU, AUSTRALIAN CATTLE DOGS, AND DEAD LION.

though they often chatter freely enough amongst themselves, especially when bushmen from different districts happen to be meeting. Their language, full of curious clicks, depends greatly, too, on the actual intonations given their words. Where we would say, for instance, "a big lion," or "very large lion," or "an enormous lion," the bushman says "Ham taakwe," "Ham ta-akwe," "Ham tā-ā-ā-kwe." Nor do they waste unnecessary words. Should you ask a bushman if a certain path is made by natives or merely by game, he will probably reply "Kocho didou" (meat track, *i.e.*, game track)—short, and to the point.

Amongst my bushmen were two small piccaninnies, Shabarra

and Kuvesha. These two youngsters did most of the grass-cutting for the pony, but were excellent hunters and trackers as well. They were probably nine or ten years old, and extraordinarily intelligent and well-behaved boys. Anyone imagining that these bush children were to be classed as a low type of humanity would be woefully mistaken. They have just as much claim to come under the title "Homo sapiens" as any other race on earth.

On several occasions, when a number of bush people of both sexes were in camp, they would hold a little dance by the firelight, the men dancing and the women keeping time by clapping their hands, and both sexes singing.

BUSHMAN AND POISON PODS USED FOR POISONING ARROWS.

Once when out hunting, my bushmen, stopping under a small tree, showed me how they dug up the little poison pods used for their arrows.

These pods are things like small acorns without the cups. Dropping off the tree, the seeds get covered by an inch or two of soil and leaves, and this causes fermentation. Inside the pods is a black treacly stuff like cobblers' wax, and I noticed that when the bushmen got any of this black stuff from a burst pod on their hands they were very careful to wipe it off again. The Maquengo bushmen call this poison "Golloo," and with it smeared on their arrows they kill zebra and other game.

These Maquengo bushmen, whose feet, like their hands, are very small and beautifully made, must also be wonderfully fine runners with great staying power, for in favourable circumstances they are able, I believe, to run down both the giraffe and eland, though I have never myself witnessed them doing this.

The giraffe, always, I believe, an old and fat one, is run down during the rainy season, when the flats are wet and boggy, for, like his cousin the camel, the giraffe is at sea on slippery or boggy ground. All the bones that I have come across where giraffes have been run down by bushmen have appeared to be of full-grown beasts. The bushmen have described their hunt to me.

They say that though they may have started their quarry early in the morning, they may not have finally got up to the giraffe and speared it to death till late in the afternoon.

These red wolves on two feet keep calling as the chase progresses, and are joined by other little parties of bushmen, who are scattered all through that country.

A big bull eland, which often becomes immensely fat, is run down in a similar manner, only in this case they choose the hottest and driest time of the year, when there is little water except in the native wells and sandpits. The fact of human beings being able to run down on foot such big and fleet animals is rather wonderful, and seems to explain the great collection of bones of wild horses and other game found in proximity to the caves and homes of the old primitive European races.

The bushmen are the most interesting of companions with whom to discuss the habits and ways of the wild life around one, particularly that most exciting and interesting of all game subjects —lions.

It is curious how strongly the fascination of this royal beast has always impressed itself on man's imagination, for many sculptures and engravings, from the most ancient times to the most modern, record this fact.

That the bushman thoroughly knows his subject need not be doubted, for was he not himself born and nursed by the fluttering light of a tiny camp fire within a little circle of boughs—his home then, as all through life—whilst from the waterhole a few hundred yards off comes, perhaps, as a welcome to the new-born infant that grandest of all sounds, a party of lions roaring on their way down to drink.

The bushmen have told me that a single big lion—that is, a male in his prime—can pull down and kill a giraffe. A lion, according to them, can and will kill a young buffalo single-handed, but an old bull buffalo is too savage and strong for any single lion. Two full-grown lions, they say, can hold and kill almost any buffalo, but I think they would have to be very hard pressed to make the attempt on an old bull.

On the other hand, lions are quite frequently killed by buffaloes, and on a former trip I twice came across the remains of lions which the local bushmen told me had been killed when attacking buffaloes.

Lions are also sometimes killed by that beautiful and gallant fighter, the sable antelope. Eland, though the biggest of African buck, have no fight in their mild dispositon, and a single lion can kill the biggest bull eland by himself.

The power of a large wild lion in his prime is really immense, and one of these fellows standing with head erect (for walking they are apt to carry it rather low) is a noble sight. It is not the

Arabian stallion only "whose neck is clothed with thunder." On this last trip I saw where a few days previously a single lion had caught and killed a full-grown wildebeeste. On the sandy soil was written quite plainly to the sharp eyes of my bushmen the whole story of the tragedy. The lion, having caught his plunging and struggling victim, had, while holding it securely with his great forepaws, eventually pulled the buck down within 40 yards, during which distance the lion's hind feet had never left the ground.

The menagerie lion, fed daily on a miserable shank of horse-flesh, though often carrying a longer and better mane, is in every other way but a caricature of his wild brother, whose fierce life is one long story of battle, murder, and sudden death.

There is a native saying:—"The lion has knives in his feet" (*i.e.*, his claws), assegais in his mouth (*i.e.*, his big canine teeth), and lamps in his head. When you see the tracks of a lion you see the footprints of a chief."

An old Boer hunter, too, once said to me:—"When the lion roars every beast of the veldt must keep still, and the natives, too, must hold their breath."

The roaring of lions has always been much discussed. It is certainly most deceptive; often one would have sworn that lions had been roaring within a few hundred yards, perhaps close to the waterhole from which one was drawing one's camp supplies, and yet their tracks in the morning would show they had not been within half a mile of us. If a lion should roar suddenly at night really close, say about 100 or 150 yards away, the great volume of sound seems, as one of my friends described it, "to rattle along the ground towards you."

After I had come to know all the pans (waterholes) in the district around Sha-neemai fairly well, I tested the distance a roaring lion could be heard by listening and asking my bushmen at what places we could hear lions. I found we could hear lions quite plainly up to roughly, 4 miles, and could still just hear their noise up to nearly 6 miles, always providing it was clear and still.

The country around was flat sand forest, and in such open country as the Free State (though of course there are no lions there now) I think that roaring lions on a clear frosty night might have been heard 10 miles away, or possibly even more.

This great beast, essentially, of course, a cat, is far more at home at night than in the daylight. He is generally considered to be particularly bold and daring in wild thunderstorm weather. The lion makes a big and, once seen, unmistakable track, but though heavy (a full-grown lion may weigh up to 500 lb.) can move with

absolute silence. I have on different occasions watched lions coming up to a bait in the moonlight, within only a few yards; and, though seeing them bulk large in front of me, could not hear the faintest sound.

Many lions are shot at night, the hunter waiting in a little bush shelter alongside the body of a dead zebra or buck left as a bait. Perhaps a more exciting way is to get your bushmen to track up the fresh spoor of a lion or lions through the sand veldt. You may often have a long walk for nothing, for if the tracks lead into hard country the bushmen may have to abandon their tracking, but, with luck, especially if the day is hot and the lions have not gone very far before lying up, you may get on to them.

When rifles are so good and hit so hard as they do nowadays, especially if there are several hunters, the wild beast has all the odds against him, but let a wounded lion get into fairly thick bush, then, unless you have good dogs, the chances rise considerably against a single hunter, for lying as flat as a hide and in good cover the lion can probably see, hear, and smell you, whilst you can do neither of the three.

Many of the brave cattle-owning tribes in Africa, such as the Masai, Nandis, and others, hunt down lions who may have started interfering with their stock, and spear them to death on foot.

Dr. Taylor, if I had not perhaps already exhausted the patience of our members, I would delight in discussing further the subject of the "king of beasts" and, had time permitted, tried to interest you further in the life and habits of the bushmen. I should like to tell you of the different edible nuts and roots found and eaten by the bush people in this, at first sight, dry and barren-looking country; a sand forest, however, that with each visit becomes less forbidding and more attractive, till even the dull similarity of its great grey expanses takes a real hold and grip on one's affections.

But in October the first signs of approaching thunderstorms may be seen gradually showing in the north-west, and plans must then be made for starting homewards. One morning, therefore, having secured some porters from the nearest Mambokushu villages, and perhaps a certain number of bushmen, the latter coming to within a day's march of the Quando, but no further, we are ready to start back to the haunts of white men. Soon after sunrise a few matches are dropped here and there into the old grass huts and bough shelters that for some months had been our home and, as the various little fires burn up fiercely in the cool morning a long line of walking carriers, with one white man and pony bringing up the rear, shows that our lion-hunting trip is over, and the party is once more making back for civilisation.

STRING-FIGURES OF THE NORTH QUEENSLAND ABORIGINES.*

PART I.

By G. A. V. Stanley, Science Research Scholar in Geography, 1925, University of Sydney.

Introduction.
Terminology.
1. String-Figures representing Plants—
The Lily Root.
The Coconuts.
2. String-Figures representing Animals—
The Freshwater Shrimp.
Fish. The Fish's Mouth.
The Frog.
The Snake. The Snake's Hole.
The Turtle.
The Seagull.
The Wallaby.
3. String-Figures representing Heavenly Bodies—
The Sun.
The New Moon.
The Star.
The Pleiades.
4. String-Figures representing Mankind—
The Dead Man impaled on a Spear.
The Wild Men Fighting.
5. String-Figures representing Manufactured Articles—
The Canoe.
Conclusion.

Introduction.

In his excellent bulletin W. E. Roth† has figured and recorded the significance of a number of intricate string-figures from North Queensland, which from analogy with the very familiar string games played by English children he called *cratch-cradles*. Since, however, he has not placed on record the manipulation and methods of forming these figures, his notes, although interesting, are of little value.

---

*Communicated to the Royal Geographical Society of Australasia (Queensland) by the Hon. General Secretary and Treasurer, July, 1926.

† W. E. Roth: North Queensland Ethnography, Bulletin No. 4, "Games, Sports, and Amusements," 1902, pp. 10-11.

String-figures (or *cat's-cradles*, as they are generally called) have attracted the attention of ethnologists from time to time, but probably owing to insufficient data the full ethnological value of the figures is not yet precisely determined.

Children's games, like folk tales and fairy stories, undoubtedly have great ethnological value. They represent in many cases the last vestiges of very ancient customs, and in this way they form a link between races. String-figures in some form or other are played by the young folk of peoples all over the world.

An interesting reference is made to cat's-cradles by Charles Lamb in his essay on Christ's Hospital.

In 1912 Miss Kathleen Haddon* published a little book which, with its small bibliography, is the best simple account of the subject.

More recent is a book by W. W. Rouse Ball,† entitled "String-Figures."

So far as is known, the manipulation of only one or two string-figures from Australia has ever been recorded.

In the following paper the manipulation of over twenty patterns is offered, illustrated by diagrams. These were collected from the children of the Yarrabah Anglican Mission Station, near Cairns, North Queensland.

Acknowledgments must be made of the kindness of the Superintendent (Mr. MacCullough) and his Staff, in offering me many facilities for my work during my brief visit to the Station. To the Chaplain, the Rev. A. C. Flint, B.Sc., special thanks are due: he supplied me with the data required for the figures of the *Coconuts*.

Terminology.

The extraordinary proficiency of the children and the almost bewildering rapidity with which they form the patterns necessitates a sort of shorthand for recording in the field. This may be evolved by each observer on his own account.

For the purposes of permanent record the nomenclature devised by W. H. R. Rivers and A. C. Haddon in 1902 is quite useful.‡

Reference to Text-figure 1 will illustrate the terms used, and the following description.

---

*Kathleen Haddon: "Cat's Cradles from Many Lands." 1912. 59 illus.

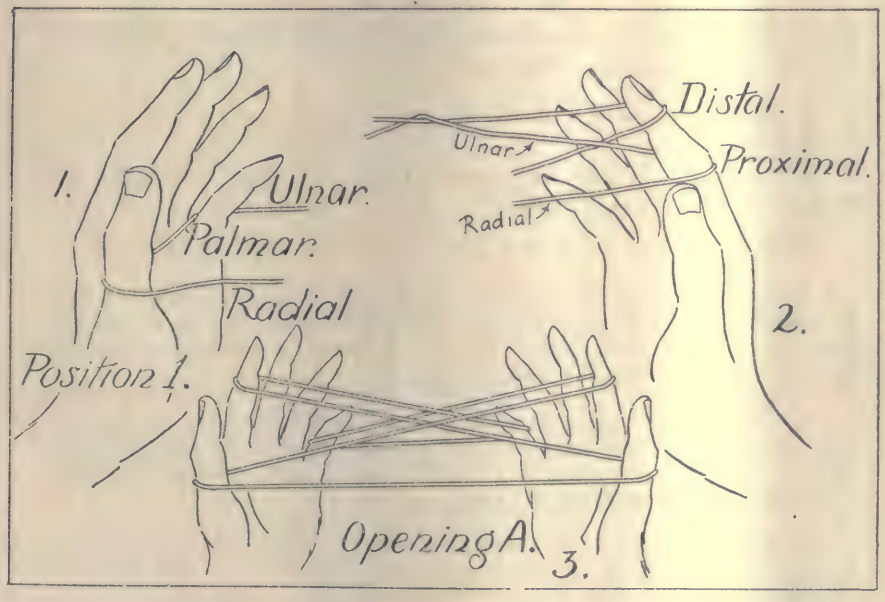
†W. W. Rouse Ball: "String Figures." pp. 69. 1921.

‡W. H. R. Rivers and A. C. Haddon: "A Method of Recording String-Figures and Tricks," *Man*, October, 1902, p. 146.

Since the original paper by Rivers and Haddon, and Miss Haddon's book, are not generally available, it seems desirable to give an outline of the system used.

Briefly, the system depends on the following points:—The fingers are denoted by the terms *thumb, index, middle, ring,* and *little.* Over any of the digits a loop may be placed. Such a loop has two strands—one on the thumb side of the digit and the other on the little finger side. These strands are termed *radial* and *ulnar* respectively. In the case where two loops are placed on the same digit, that which is nearer the tip of the digit is termed *distal,* while that nearer the base is termed *proximal.* A strand crossing the palm is termed *palmar,* while one crossing the back of the digits is termed *dorsal.*

During the manipulation certain strands are picked up by or dropped from the digits. In picking up a strand the digit may be



Text-figure 1.
DIAGRAMS ILLUSTRATING THE TERMS USED IN DESCRIBING THE FIGURES.

inserted into a loop from either the *distal* or from the *proximal* side. Again, before being inserted into a loop the digit may be passed (for example) on the ulnar side of *this* strand and distal to *that.* In short, these terms give a ready means of orienting and identifying any particular strand in any figure.

In the following descriptions it has been the aim to avoid the least ambiguity. This has been attained at times only by making the statements of some of the steps somewhat lengthy and possibly a little prolix.

As pointed out by Miss Haddon, certain elementary positions and movements are common to many of the figures. These are illustrated in Text-figure 1. *Opening A* is developed from *Position 1* by picking up with the index fingers, from the proximal side, the palmar loop of the opposite hand, the left palmar loop being picked up first.

1. *String-figures representing Plants.*

The Lily Root.—This figure closely resembles three of the figures described by Miss Haddon. The first represents the *Temporary Grass Hut*, and is from Central Africa; next is a *Hogan* (or Hut) made by the Navaho Indians of North America; the third is the *Tallow Dips*, a figure very common in Great Britain.* In all of these cases the manipulation is different from the method of the Yarrabah children, which is as follows:—

1. Place the string over the thumb and little finger of the left hand, as for position 1.

2. With the right index and thumb take the left palmar string and pull it to the right as far as it will come.

3. Repeat, pulling out the left palmar loop which crosses the left wrist.

4. Insert the right hand into the big loop from the distal side, and with the right index and thumb grasp the ulnar strand of the loop round the left little finger *and* the radial strand of the loop round the left thumb, and pull them out together as far as they will come.

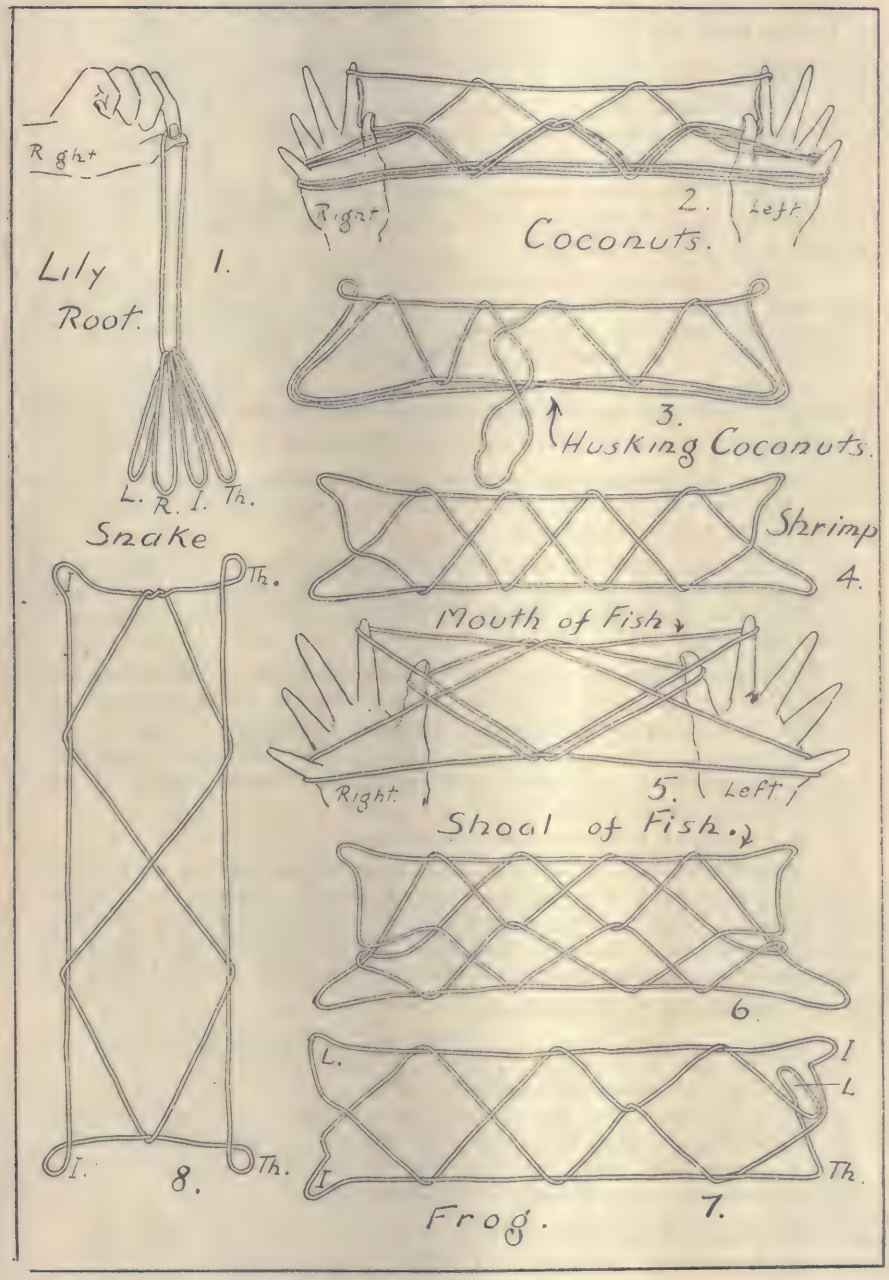
5. Place the four long strings to the back of the left hand so that each one passes between two fingers, *i.e.*, so that the radial string passes between the left thumb and index, and so on until the ulnar string passes between the ring and little fingers of the left hand.

6. With the right index and thumb pull the small palmar loop, which appears in the centre of the left palm, as far as possible, and the pattern is developed.

The loops which lead from the proximal ends of the digits of the left hand represent the roots of the plant, while the single loop which leads from the right hand represents the stem. (*See* Text figure 2, No. 1.)

The Coconuts.—This consists of three figures which are developed one from the other. The first figure has been given by

* Ibid.: pp. 29, 47, and 74.



Text-figure 2.

STRING-FIGURES REPRESENTING PLANTS AND ANIMALS.

(Note.—These figures are drawn as they appear to an onlooker—that is, back-to-front, as they appear to the person making them.)

The letters Th., I., R., and L. denote the thumb, index, ring, and little fingers respectively.

No. 7 should be held vertical, like No. 8.

Roth* from Cape Grafton, where it has the same meaning as at Yarrabah, which is not surprising. It is formed as follows:—

1. Opening A.

2. Pass the indices proximal to the strands of the loops round the little fingers, and draw back both strands of those loops.

3. Insert the indices into the loops round the thumbs from the distal side, and draw back the radial strand of those loops, turning the loops off the thumbs and on to the indices.

4. Turn the hands downwards and forwards, allowing all the strings to turn loosely around the fingers; continue the turning movement until finally the hands are in a position with the palms facing each other, the fingers extended and horizontal, and the thumbs are vertical.

5. Passing the thumbs proximal to the strands of the loops round the indices, insert them into the loops round the little fingers from the proximal side, and draw back the radial strand of those loops.

Insert the thumbs into the loops round the indices from the proximal side and pinch the ulnar strands of both these loops (there are two loops on each index) between the thumbs and indices.

6. Turn the hands (keeping the two ulnar strands pinched between the thumbs and indices) downwards and forwards, slipping the loops off the thumbs on to the indices. Finally hold the hands in the same position as described in Step 4.

7. Insert the thumbs into the loops round the indices from the proximal side, and draw back the radial strands of those loops, at the same time letting slip the loops round the little fingers. Draw all strings taut.

8. Insert the little fingers into the (three) loops round the indices, from the proximal side, and of the three ulnar strands of these loops draw back the two more proximal ones.

9. Let slip all the loops round the indices.

10. Insert the indices into the loops round the thumbs from the proximal side, and with the back of the index fingers raise the ulnar strands. Extend the hands, keeping the string near the quick of the nail and down alongside the upraised indices, the thumbs being used to keep it in position. The hands are turned palms outwards, thumbs inwards. (*See* Text-figure 2, No. 2.)

This shows *Two Coconuts.*

Having developed this figure the game proceeds as follows:—

11. Drop the loops off the upraised indices.

12. Insert the indices into the proximal loop round the little fingers from the distal side, and with the palmar side of the digits draw back the radial strand of that loop. Keep the string near the tip of the indices. Turn the hands, as shown for the *Coconuts* in Text figure 2, No. 2.

13. Slip the loops off the thumbs (gently).

14. Slowly draw the hands apart with a "sawing" motion.

Some strands break loose. These represent the *Coconut being husked.* (*See* Text-figure 2, No. 3.)

* Ibid.: Plate iv., fig. 4.

Draw the hands as far apart as possible.

The game then proceeds as follows:—

15. Passing the thumbs proximal to the strands of the loops round the indices, insert them into the proximal loops round the little fingers from the distal side, and with the back of the thumbs draw back the radial strand of those loops.

16. Slip the loops off the little fingers.

17. Transfer the loops which are round the indices to the little fingers.

18. Insert the thumbs into the loops round the little fingers from the proximal side and draw back the radial strand of those loops.

19. With the indices, raise the ulnar strand of the proximal loops round the thumbs, keeping the string near the nail, and turning the hands, as described in Step 10, so as to bring the figure into view.

This represents the *Coconuts Broken into Four Fragments.* (See Text-figure 2, No. 4.)

This last figure is identical with the next, which is that of the *Freshwater Shrimp.*

2. *String-figures representing Animals.*

The Freshwater Shrimp (*Jun-ghi* or *Joonghi*).*—This figure is recorded by Roth from Princess Charlotte Bay, where, as at Yarrabah, it indicates *Four Shrimps*, each square indicative of a crustacean.†

The figure is produced as follows:—

1. Make a small loop in the string.

2. Insert the index fingers into this loop, keeping the thumbs inside the very much larger loop; extend the hands.

3. Place the pattern on the lap, with the finger tips downward.

4. Gently withdraw the fingers from the loops and insert the hands and wrists into the nearer loop, passing them under the proximal (nearer) strand and extending slightly, so as to bring the strand into a dorsal position round each wrist; then insert the little fingers into the farther loop from the distal (under) side. Extend the hands. There should now be a loop around each wrist and one round each little finger.

5. Take the loops which are round the wrists, draw them up and over all the fingers and place them on the respective thumbs.

6. Insert the thumbs into the loops round the little fingers from the proximal side, and draw back the radial strand of those loops.

7. Insert the indices into the loops round the thumbs from the proximal side, and with the back of the digits raise the ulnar strand of those loops, keeping the string near the quick of the nail and down alongside the upraised digits, the thumbs being used to keep it in position. The hands are turned palms outward, thumbs inward, as in Text-figure 2, No. 2.

---

* Aboriginal term meaning Shrimp.

† Ibid.: Plate viii., fig. 2.

This represents the *Four Shrimps*, each diamond in the figure representing an individual. (*See* Text-figure 2, No. 4.)

Fish.—This consists of two figures which are developed in sequence. The second figure has been given by Roth from Cape Grafton, where it indicates *Mullett skimming along the surface of the water.**

The figures are developed as follows:—

1. Hold part of the string between the thumbs and indices, the hands being about six inches apart; make a small loop by bringing the right hand towards the body and to the left. Hold the strings between the thumbs and indices so that both loops hang down. Place both loops between the teeth.

2. With the strands of the larger loop only place the strings in Opening A.

3. Slip the loops off the little fingers.

4. Insert the little fingers into the small loop from the proximal side; release from the mouth and extend the hands.

5. Transfer the loops from the little fingers to the distal ends of the indices.

6. Passing the little fingers proximal to the strands of the loops round the indices, insert them into the loops round the thumbs from the proximal side, and with the back of the digits catch the ulnar strand of those loops, and draw it back, carrying it on the proximal side of all the other strings.

7. Insert the little fingers into the distal loop round the indices from the proximal side, and with the back of the digit draw back the ulnar strand of these loops.

8. Lift the proximal loop on the little fingers over the distal loop on the same digits, over the tip of the finger, and on to its palmar aspect.

9. Slip the distal loops off the indices. Spread out the fingers.

The central diamond-shaped area in the figure represents the *Mouth of a Fish*. (*See* Text-figure 2, No. 5.)

The game then proceeds as follows:—

10. Transfer the loops from the little fingers to the distal ends of the indices.

11. Repeat Step 6.

12. Repeat Step 7.

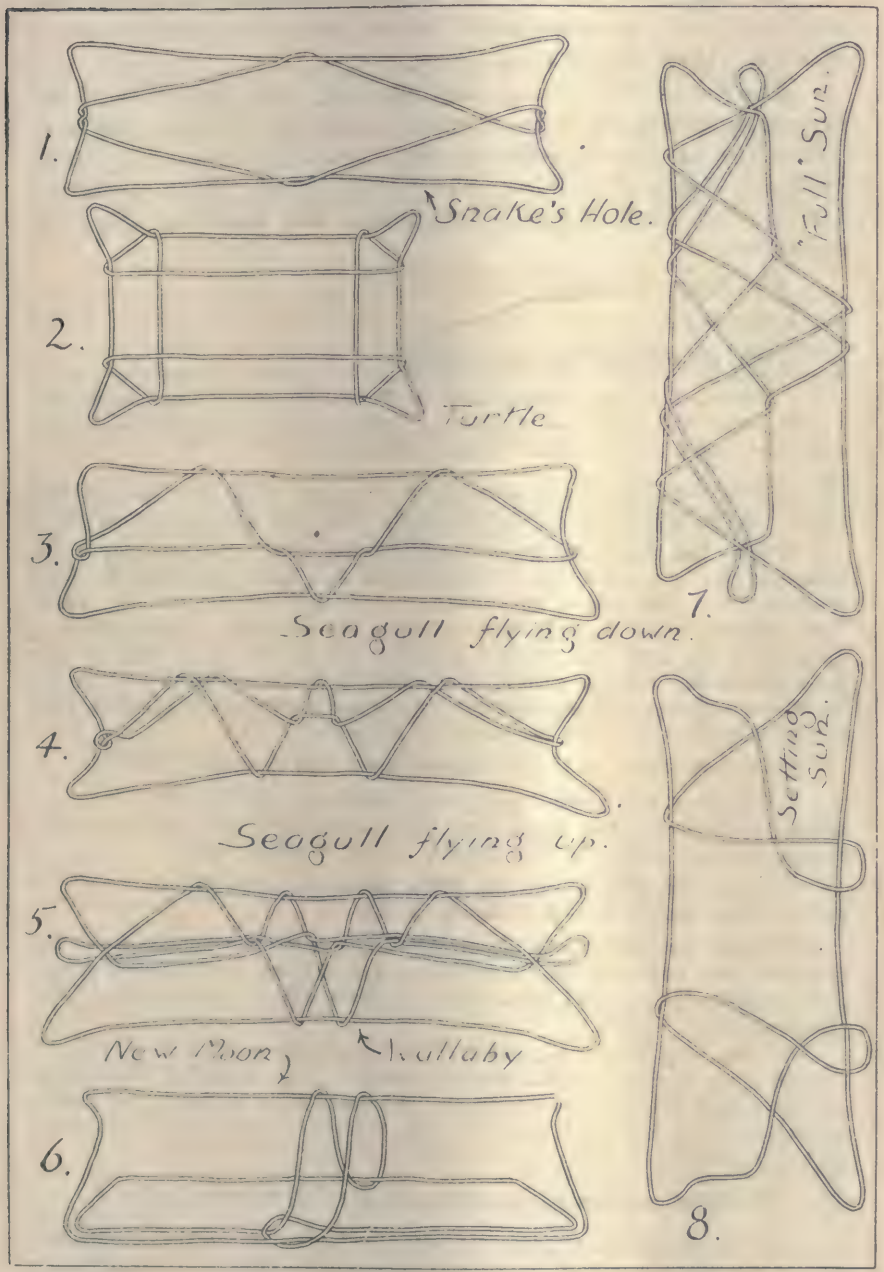
13. Repeat Step 8.

14. Slip the loops off the thumbs.

15. Transfer both index loops to the thumbs.

16. With the back of the indices raise the ulnar strand of the distal loops round the thumbs, keeping the string near the quick of the nail, and down alongside the upraised digits, the thumbs being used to keep it in position. The hands are turned so that the indices are vertical, the palms are out and the thumbs face each other, as in Text-figure 2, No. 2.

* Ibid.: Plate vii., fig. 5.



Text-figure 3.

STRING-FIGURES REPRESENTING ANIMALS AND HEAVENLY BODIES.

The pattern is complete; the figure represents *Numerous Fish.* Each diamond represents an individual, and there should be seven of these. (*See* Text-figure 2, No. 6.)

The Frog.—This closely resembles a figure given by Roth from several localities, in each of which it has a different meaning. These are as follows:—*Honey: the "cells" of the comb,* Cape Bedford; *Scales of the Crocodile,* Middle Palmer River; *Scales of the Iguana,* Night Island, Burketown; and *Lobes of Fat*—i.e. *bandicoot.*

The figure is formed as follows:—

1. Opening A.

2. Slip the loops off the little fingers.

3. Passing the little fingers distal to the strands of the loops round the indices, insert them into the loops round the thumbs from the proximal side, and draw back the ulnar strand of those loops.

4. Take the loops round the indices and place them over the opposite hands, the right-hand loop being taken first. Draw the hands gently apart.

5. With the thumb and index fingers of the right hand take the ulnar strand of the loop round the left thumb *and* the radial strand of the loop round the left little finger, and, holding these two, withdraw the left hand from the loop round the left wrist. Replace the two loops (held as above) over the thumb and little finger respectively of the left hand. Repeat the same process with the right hand. (In effect the two loops which were round the wrists have been slipped, while the loops round the thumbs and little fingers have been retained.) Draw the hands gently apart.

6. Place the figure on the lap with the finger-tips downward.

7. Withdraw the thumbs from their loops, and with the backs of the thumbs pick up the two small loops which cross the figure on either side. Retain the loops round the little fingers. Draw the hands apart.

8. Insert the thumbs into the loops round the little fingers from the proximal side and draw back the radial strand.

9. Insert the indices into the proximal loop round the thumbs from the proximal side, and raise the ulnar strand, keeping the string near the nail and alongside the upraised index fingers with the aid of the thumbs (in the usual manner).

10. This step is very important. Turn the hands so that the left hand has the palm upwards and the thumb outwards (away from the body), and the right hand has the palm downwards and the thumbs inwards. The figure is held with the left hand near the chest, while the right arm is extended as far as possible.

This figure represents the *Frog.* (*See* Text-figure 2, No. 7.)

The Snake.—This figure is given by Roth from Cape Bedford, where it denotes the *deaf-adder: the fingers of the one hand are moved to represent the teeth and mouth.**

* Ibid.: Plate vi., fig. 3.

The figure is produced as follows:—

1. Place string in Position 1. (*See* Text-figure 1.)

2. Pass the back of the right thumb distal to the left palmar string and draw this string back. Pull the hands apart.

3. Insert the left thumb into the loop round the left little finger from the proximal side and draw back the radial strand of that loop.

4. With the indices, raise the ulnar strand of the loops round the thumbs, keeping the string near the nail of the upraised digits.

5. On each thumb lift the proximal loop over the distal one and over the top of the digit on to its palmar aspect. (In practice this is done by grasping with the teeth the strand which passes directly between the two thumbs, and with a twist of the wrists carrying out the operation described more elaborately above.) The operation would be referred to by Miss Haddon as *Navahoing*.*

6. Let slips the loops round the little fingers.

7. Turn the hands so that the left hand has the palm inwards and the thumb to the left and vertical, and the right hand has the palm outwards and the thumb to the left and horizontal; the left hand is held near the chest, while the right arm is extended as far as the string will allow. (*Cf.* the final position of the *Frog*.)

This figure denotes the *Snake*. (*See* Text-figure 2, No. 8.)

The Snake's Hole.—This is a simple figure and acts as a kind of corollary to the preceding one. It is formed as follows:—

1. Opening A.

2. Let slip the loops off the thumbs.

3. Transfer the loops from the indices to the thumbs.

4. Insert the thumbs into the loops round the little fingers from the proximal side, and draw back the radial strand of that loop.

5. Insert the indices into the loops round the thumbs from the proximal side and raise the ulnar strand of that loop.

6. On each thumb lift the proximal loop over the distal one, and over the top of the digit on to its palmar aspect. (This action is described at length for the *Snake*, Step 5, which see.)

7. Let slip the loops off the little fingers.

8. Turn the hands so that the left hand has the fingers vertical with the thumb pointing to the body, while the right hand has the fingers pointing downwards and the thumb away from the body; the two palms face each other.

The large diamond-shaped area in the figure is the *Hole of the Snake*. (*See* Text-figure 3, No. 1.)

* Ibid. p. 5.

The Turtle.—This has been figured by Roth,* in the first case from Cape Bedford, where is represents a *Canoe on the water—the four hands rocking it;* and in the second case a *Fish-net.* Spencer and Gillen† have given it also, from the Gulf of Carpentaria, where it denotes the *Dugong.*

This figure is one of the most complicated to watch being formed, but in reality, when the steps are analysed, it is quite simple. It is played by two children (let us call them X and Y), who sit on the ground facing each other, as follows:—

1. Both players take a separate closed loop of string and hold it in Opening A.

2. X inserts the hands, with the string attached, *into* the loop round Y's indices, from the proximal side.

3. Y lets slip the loops round the indices. These loops take up a dorsal position around X's wrists.

4. Both players then draw their hands towards themselves, *i.e.,* X reverses Step 2, being sure to retain the loops round the wrists.

5. X takes the loops off the indices and places each one over Y's respective nearest wrist.

6. Still holding their hands towards themselves the following operation is carried out by both players:—With the thumb and index finger of the right hand grasp the ulnar strand of the loop round the left thumb, *and* the radial strand of the loop round the left little finger, and holding these two together slip the left hand out of these loops *and* at the same time out of the loop which passes dorsally round the left wrist, replacing the thumb and little finger into their original loops. Repeat the operation on the right hand. (*Cf.* Step 5, of the *Frog.*)

7. X raises the hands, placing the palms together, while Y places the hands side by side and palms upward on the ground. The strings are now vertical, from X's hands to Y's hands.

8. X gently slips all the loops off the fingers, and starting at the top rolls the strings into a tangled ball, which is placed in Y's cupped palms.

9. Y holds the tangled string-ball in the two hands, raises the hands to the lips, blows into the opposed palms, places the hands to the right cheek and then to the left cheek, and in some cases murmurs a few unintelligible words. This is probably *hocus-pocus,* meant to mystify the onlookers, and supposedly bring about the untangling of the string.

10. Y holds the hands in front, facing X, with the palms together and the fingers vertical.

11. X pulls the two small loops which appear around Y's little fingers; Y slips these loops but retains the loops round the thumbs. X and Y pull gently against each other with a *sawing* motion, and like magic the tangled strings unravel and the pattern appears.

---

*Ibid.: Plate xii., figs. 4 and 5.

†Spencer and Gillen: "Across Australia."

The figure is quite clear. The rectangular space forms the carapace of the *Turtle*, while the triangles at each corner represent the flippers. (*See* Text-figure 3, No. 2.)

The Seagull.—This is one of the most realistic of the figures. It is formed in two stages, as follows:—

1. Loop the string over the thumbs.

2. Passing the left little finger radial to the radial strand of the loop round the left thumb, insert it into this loop from the proximal side, and with the back of the digit draw back the radial strand.

3. Do the same with the left little finger to the loop round the right thumb.

4. Insert the thumbs into the loops round the little fingers from the proximal side and draw back the radial strand.

5. With the indices raise the ulnar strand of the proximal thumb loop, keeping the string near the tip of the digit.

6. On each thumb lift the proximal loop over the distal one, and over the top of the digit on to its palmar aspect (*Cf.* Step 5 of the *Snake*).

7. Transfer the strand round the upraised indices to the thumbs so that it becomes radial and distal.

8. With the indices raise the ulnar strand of the loops round the thumbs, and hold the hands (*see* Text-figure 2, No. 2) in the usual manner to show the figure.

This shows the *Seagull flying down.* (*See* Text-figure 3, No. 3.)

The game then proceeds as follows:—

9. Gently let slip the loops which are round the little fingers, and turn the strand, which is round the upraised indices, on to the little fingers so that is becomes ulnar.

10. Repeat Step 8.

This shows the *Seagull flying up.* (*See* Text-figure 3, No. 4.)

The Wallaby.—This figure is recorded by Roth from the lower Tully River, where it indicates a *Pouch*, and so a *Wallaby*. In one or two small details the pattern given by Roth* differs slightly from mine.

The figure is formed as follows:—

1. Opening A.

2. Pass the indices proximal to the strands of the loops round the little fingers, and draw back both strands of those loops.

3. Insert the indices into the loops round the thumbs from the distal side, and draw back the radial strand of those loops, turning the loops off the thumbs and on to the indices.

4. This step is most important. Turn the hands forwards and downwards, then turn the palms inwards until they face each other; the palms must be

* Ibid.: Plate iii., fig. 8.

vertical with the thumbs pointing upward and the fingers pointing forward. During this step the strings must be held fairly loosely, so as to allow the loops to slip around the fingers as they turn.

(So far, step for step, this procedure has been identical with the *Coconuts*, which see.)

5. Passing the thumbs proximal to the strands of the loops round the indices, insert them into the loops round the little fingers from the proximal side, and draw back the radial strand of those loops.

6. Insert the thumbs into the distal loop round the indices from the proximal side, and draw back the radial strand of this loop.

7. With the aid of the teeth, on each thumb lift the proximal loop over the distal one, and over the top of the digit on to its palmar aspect. (*Cf.* Step 5 of the *Snake*.)

8. Let slip the distal loop off the indices.

9. Passing the thumbs distal to the strands of the loops round the indices, insert them into the loops round the little fingers from the proximal side and draw back the radial strand of those loops.

10. With the indices raise the ulnar strand of the proximal loop round the thumbs, keeping the string near the nail of the extended digits. Hold the hands in the usual manner (as in Text-figure 2, No. 2) to show the figure.

This represents the *Wallaby*. (*See* Text-figure 3, No. 5.)

3. *String-figures representing Heavenly Bodies.*

Comparison with Roth's figures and some given by Miss Haddon shows that there is considerable variation in the figures depicting celestial bodies.

The Sun.—This is formed as follows:—

1. Opening A.

2. The loops round the indices are taken off and slipped right over their respective hands so as to take up a dorsal position on the wrists.

3. Pass the indices distal to the strands of the loops round the little fingers, and with the palmar side of the digits pull both strands of these loops back.

4. With the two strands so caught, still held by the indices, insert these digits into the loops round the thumbs from the distal side, and draw back the ulnar strand of those loops, at the same time slipping the loops off the thumbs and releasing the two strands of the loops round the little fingers, which had been drawn back in Step 3. Do not let slip the loops off the little fingers.

5. Transfer the loops which are round the indices to the respective thumbs.

6. Transfer the loops which are round the wrists to the respective indices.

7. Passing the thumbs distal to the strands of the loops round the indices, insert them into the loops round the little fingers from the proximal side, and draw back the radial strand of those loops.

8. With the indices raise the ulnar strand of the loops round the thumbs, keeping the string near the nail of the extended digits. Hold the hands in the usual position (as in Text-figure 2, No. 2) to show the figure.

This represents the *"Full" Sun*. Probably the central inverted triangles denote the luminary itself, while the other strings represent rays. (*See* Text-figure 3, No. 7.)

From this figure the *Setting Sun* may be developed as follows:—

9. Lower the upraised indices.

10. Gently slip the loops from the indices. Do not draw the hands apart.

11. With the indices raise the ulnar strand of the loops round the thumbs and hold them in the same position as for the *"Full" Sun*. Draw the hands apart gently, with a *sawing* motion.

The figure of the *"Full" Sun* breaks up (owing to the loops round the indices being slipped), and these two loops (*see* Text-figure 3, No. 8) represent the *Sun Falling*. Finally, all that is left is a plain rectangle. The Sun has set.

The "Half" Moon.—By this title the children at Yarrabah know the *New Moon*. It may be developed as follows:—

1. Loop the string over the thumbs.

2. Insert the little fingers into the loops round the thumbs from the distal side, and draw back the radial strand of those loops.

3. With the right thumb pick up the left palmar string from the proximal side, and draw the hands apart.

4. Take the proximal loop off the right thumb and hold it in the teeth.

5. With the right thumb and index take the radial strand of the loop round the left little finger *and* the ulnar strand of the loop round the left thumb, and lift the two loops carefully off the left hand. Insert the left little finger distally into the left little finger loop, and proximally into the left thumb loop, and replace the two loops on the left hand. (In effect the left little finger loop has been rotated clockwise through 180°, while the ulnar strand of the left thumb loop has been placed round the left little finger.) Repeat with the right hand.

6. Insert the indices into the proximal loops round the little fingers from the proximal side, and raise the radial strand of these loops.

7. Release the loop from the teeth. Hold the hands with the palms facing each other, the fingers widespread, and the indices vertical.

The *Crescent Moon* is quite strikingly obvious in this figure. (*See* Text-figure 3, No. 6.)

The Star.—This figure has been given by Roth* from Cape

* Ibid.: Plate x., fig. 2.

Bedford, where is represents the *Sun with Full Rays*. Roth's figure differs from mine (*see* Text-figure 4, No. 1) in having no loop round the base of the indices. In other respects it is identical. The figure is formed as follows:—

1. Opening A.

2. Passing the thumbs distal to the strands of the loops round the indices, insert them into the loops round the little fingers from the distal side, and draw back the ulnar strands of those loops.

3. Insert the indices into the loops round the thumbs from the distal side, and turn the hands so that the palms are out (away from the body), the digits are extended with the indices vertical, and the thumbs are facing each other.

4. *With the hands in this position* insert the thumbs into the loops round the indices from the proximal side, and pinch between the indices and thumbs the ulnar strand of the distal loops round the indices. Turn the hands downwards and forwards, finally holding them with the palms facing each other, the thumbs vertical and the digits extended and sub-horizontal. There should now be two loops on each index, and one on each little finger.

5. Passing the thumbs proximal to the strands of the loops round the indices, insert them into the loops round the little fingers from the proximal side, and draw back the radial strand of those loops.

6. Insert the thumbs into the distal loops round the indices from the proximal side, and draw back the radial strand of those loops.

7. With the aid of the teeth, on each thumb lift the proximal strand over the distal one, and over the tip of the digit on to its palmar aspect. (As in Step 5 of the *Snake*.)

8. Let slip the distal loop off the indices.

9. Passing the thumbs distal to the strands of the loops round the indices, insert them into the loops round the little fingers from the proximal side, and draw back the radial strand of those loops.

10. With the indices, raise the ulnar strand of the loops round the thumbs, keeping the string near the nail of the extended digits, and holding the hands in the usual manner (as in Text-figure 2, No. 2) to show the figure.

This represents the *Star*. (*See* Text-figure 4, No. 1.)

The Pleiades (the Seven Sisters or the Seven *Wokkul**).—According to aboriginal mythology, the constellation of the Pleiades is peopled solely by women.

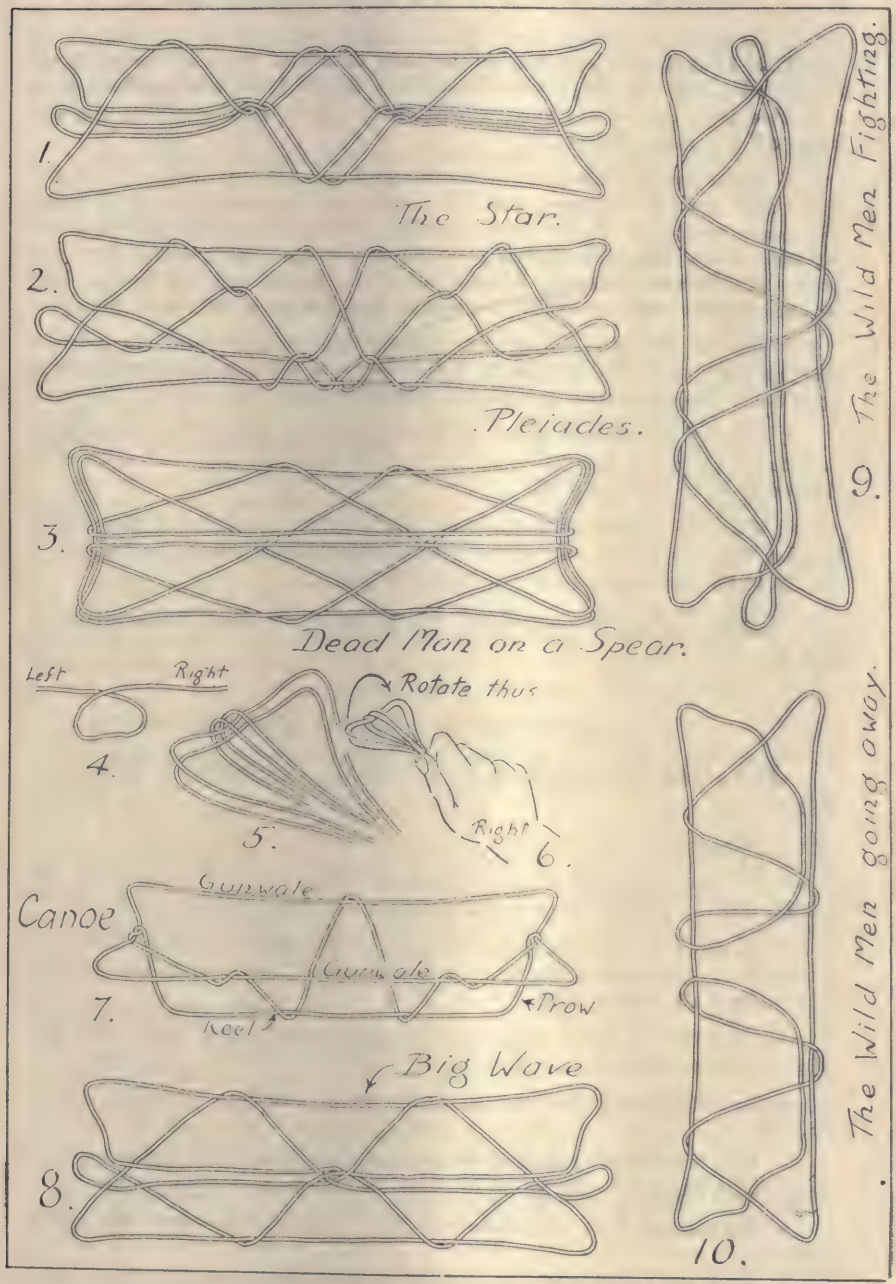
This beautiful figure is formed as follows:—

1. Opening A.

2. Passing the thumbs distal to the strands of the loops round the indices, insert them into the loops round the little fingers from the proximal side, and draw back the radial strand of those loops.

3. Insert the indices into the loops round the thumbs from the proximal side, and raise the ulnar strand of those loops, at the same time slipping the loops off the thumbs.

* Aboriginal word meaning girls.



Text-figure 4.

STRING-FIGURES REPRESENTING HEAVENLY BODIES, MANKIND, AND MANUFACTURED ARTICLES.

Nos. 4 to 6 represent stages in forming No. 3.

4. Passing the thumbs *distal* to the radial strand of the proximal loops round the thumbs, and *proximal* to the ulnar strand of the same loops, insert the thumbs into the loops round the little fingers from the proximal side, and draw back the radial strand of those loops, at the same time slipping the loops off the little fingers.

5. Insert the little fingers into the distal loops round the indices from the distal side, and (by catching with the palmar side of the digits) draw down the ulnar strand of those loops, drawing them proximal to all the other strands; insert the little fingers into the loops round the thumbs from the proximal side, and (with the dorsal side of the digits) draw back the ulnar strand of those loops, at the same time slipping the loops off the thumbs.

6. Remove the distal loop from the left index finger, turn it clockwise through 180°, and place it over the left thumb; repeat with the corresponding right hand loop, turning it anti-clockwise through 180°.

7. Passing the thumbs distal to the loops round the indices, insert them into the loops round the little fingers from the proximal side, and draw back the radial strand of those loops.

8. With the indices, raise the ulnar strand of the loops round the thumbs, keeping the string near the nail of the extended digits (as in Text-figure 2, No. 2) in the usual manner to display the figure.

Seven diamonds represent the *Pleiades*. (*See* Text-figure 4, No. 2).

4. *String-figures representing Mankind.*

The Dead Man impaled on a Spear.—The figure is formed as follows:—

1. Opening A.

2. On each hand, transfer the loops which are round the indices to the middle fingers, and the loops round the thumbs to the indices.

3. In the radial strand of the loop round the indices make a small loop, as shown in Text-figure 4, No. 4. Into this insert the thumbs from the proximal side. Draw all strings taut.

4. Transfer the loops which are round the thumbs over both index and middle fingers. Do this on each hand.

5. Transfer the loops from the little fingers over both index and middle fingers.

6. Lift the dorsal portion of the proximal loop round the indices over the more distal loops, over the tip of the digit and on to its palmar aspect.

7. Repeat the same operation with the proximal loops round the middle fingers.

8. With the right hand grasp all the strands leading from the loops round the left fingers, and lift the loops off those fingers. Turn the two loops over once through 180°, and replace them on the left thumb and index finger. (*See* Text figure 4, Nos. 5 and 6.) Repeat the operation on the right hand.

9. Extend the thumbs and indices so as to spread out the pattern.

The *Man* is represented in the pattern by two overlapping diamonds, while two long strings represent the *Spear*. (*See* Text-figure 4, No. 3.)

The Wild Men Fighting.—This consists of two figures, formed as follows:—

1. Opening A.

2. Insert the thumbs into the loops round the indices from the distal side, and passing them proximal to the strands of the loops round the little fingers, with the back of the digits draw back both strands of these loops.

3. Pass the indices into the loops round the thumbs from the distal side, and turn the hands so that the palms are turned outward, and the indices are extended and vertical. In effect the loops have been slipped off the thumbs (which have now no loops on them), and have been transferred to the indices, which now have two loops on them.

4. Passing the thumbs radial to the strands of the loops round the indices (and also passing them on the ulnar side of the ulnar strand of the proximal loops round the indices), pinch the ulnar strand of the distal loops round the indices, between the indices and thumbs.

Keeping this strand pinched between the thumbs and indices, turn the hands downward and forward, allowing the other strings to slip around the fingers as the hands turn, and finally bring the hands into a position with the palms facing each other, and the thumbs extended and vertical. In effect both loops on the indices have been taken and twisted through 360°.

5. Transfer the distal loops round the indices to the thumbs.

6. Passing the thumbs distal to the strands of the loops round the indices, insert them into the loops round the little fingers from the proximal side, and draw back the radial strand of those loops.

7. With the indices, raise the ulnar strand of the loops round the thumbs, and extend, keeping the string near the nail of the digits, and hold the hands in the usual position to show the figure (as in Text-figure 2, No. 2).

This shows *Two Wild Men Fighting*, each with a horizontal *Spear*. (*See* Text-figure 4, No. 9.)

The game then proceeds:—

8. Drop the loops off the upraised indices.

9. Gently slip the loops off the indices.

10. With the indices, raise the ulnar strand of the loops round the thumbs, and hold the hands in the same position as at the end of Step 8. Pull the hands gently apart with a *sawing* motion, and the figure breaks up.

This shows *Two Wild Men Going Away*. (*See* Text-figure 4, No. 10.)

5. *String-figures representing Manufactured Articles.*

The Canoe.—This has been figured by Roth from Cape Grafton, Cape Bedford, Princess Charlotte Bay, and Night Island.*

* Ibid.: Plate xii., fig. 2.

It is produced as follows:—

1. Loop the string over the thumbs.

2. With the back of the right little finger, pick up the radial strand of the loop round the left thumb, the digit being inserted into the loop from the proximal side. Repeat, with the left little finger and the loop round the right thumb.

3. Insert the thumbs into the loops round the little fingers from the proximal side, and draw back the radial strand of those loops.

4. With the indices, raise the ulnar strand of the proximal loops round the thumbs.

5. With the aid of the teeth, on each thumb lift the proximal loop over the distal one, over the tip of the digit and on to its palmar aspect (as in Step 5 of the *Snake*).

6. Slip the loops off the little fingers.

7. With the little fingers pull down the middle one of the three longitudinal strands in the pattern. This forms the keel of the canoe.

This figure represents the *Canoe*. (*See* Text-figure 4. No. 7.)

Conclusion.

In many books we may read of the customs and laws and habits of the aborigines. Less frequently we come across accounts of their games.

The collection of cat's cradles forms a delightful pastime. It cannot be stressed too strongly that we must collect every scrap of information about the dark people who lived in this land before us. Their children are educated in our schools and tend to forget the ways of their parents. At Yarrabah it is only the old people who still use the native tongue.

Let all who have the chance, then, collect whenever possible any scraps of data on native games, and fairy tales, and legends, and beliefs, for soon (unhappily) it may be too late.

It is hoped in Part II. to record some additional string-figures from Yarrabah.*

* In September, 1926, the writer collected over forty string figures at Yarrabah, and several from a Murray Island lugger "boy" at Michaelmas Cay, near Cairns. These will appear in the "Queensland Geographical Journal" as Part II. of this paper.

THE AUSTRALIAN ABORIGINE.

By T. A. Williams.

Much has been written concerning the blackfellow of Australia by travellers and others who have been directly or indirectly associated with him. First impressions have been recorded with honest conviction that the pictures and thoughts conveyed to the white man's mind, judged and viewed from his own standpoint, were authentic and real. Yet how very wide are actual facts from many articles written concerning the Aborigine.

As we view him from the height of twenty centuries of civilisation, we can safely say the Australian native represents the most archaic people extant, and reveals the conditions under which the early ancestors of the human race existed.

Spencer, in his work on the Aborigine, states:—"It is fairly certain that man's nearest living relations are the anthropoid ape, the gorilla, and the chimpanzee. He possesses, in common with the gorilla and the chimpanzee, about three hundred structural features that are not found in the lower monkeys. Turner has pointed out that the similar features are not all concentrated in any single race, but it is allowed that the Australian aboriginals exhibit the largest number of ape-like characters, and belong to the primitive races of mankind.

It is supposed that Neanderthal man, and man of his type, who have long been extinct, lived for many thousand years contemporaneously with a "Homo" of another type, and from this other type the modern races have sprung. One notable character of Neanderthal man—in fact, the feature most obvious to ordinary observation—was the forehead with its large glabella and prominent superciliary ridges; and it was once thought that this showed an affinity, if not a racial connection, between that type and the Aboriginal, such as existed in no other modern races.

There are three great divisions of the human race—Black, White, and Yellow. Each division has its own characteristics. The Aborigine possesses the characteristics common to the three. Professor Kent gives us a new viewpoint when he said:—"Of all the races of mankind now alive, the Aboriginal race of Australia is the only one, in my opinion, that could serve as a common ancestor of all modern races. The common ancestor has to yield

descendants which, on the one hand, might become the typical inhabitants of Central Africa; and on the other, the fair-haired natives of North-Western Europe. The Australian native has these distinctions and generalised characters needed for such an ancestral form."

Formerly, he was classed with the Negroes, because both possessed a flat nose, protruding lips, projecting jaws, large-sized teeth, and, I suppose, a "black skin!" Yet these characters are very variable, not only in the Australian natives and Negroes, but in all races, and are just the characters that change very rapidly in individuals and in the race on account of environment and habits. Further, they are characters that would become specially developed and fixed in apes and in the lower human races on account of similarity of food, habit, and surroundings.

We can safely look abroad from Africa for the parent stock of the Aborigine of Australia, notwithstanding both have many features in common. Yet the Negro is a much higher type of being—historically, mentally, and physically. The human being, as such, is a spiritual animal with a desire to advance; the Aboriginals have not advanced beyond the primitive nomadic age. They have never produced a great general, nor statesman capable of organising a campaign or to weld tribes into nations. They are not agriculturists nor labourites. If all agriculturists were withdrawn from the bush and left their stock and prize cattle to roam the land, in a few months the civilised domesticated blackfellow would "go bush" and spear all he came in contact with. The Aborigine could not, unassisted, take up agriculture as a means of subsistance. It would be a super-miracle to find a blackfellow working hard continuously, day by day, without becoming ill.

Many writers advocate the theory that the Australian natives and the Dravidians of India have sprung from a common branch of the human race, and that the Caucasians have undoubtedly sprung from the Dravidians. If so, this makes the Australian blackfellow more nearly related to us than the comparatively civilised Malays, Mongols, and Negroes. This view points out that the Aborigine is racially the uncle of Caucasians.

Writers of their first impressions of the Australian natives are struck with the particular beauty of their hair. Jet black in colour; occasionally here and there dark brown, and exceedingly fine in texture. When well groomed it is wavy. Doubtless many writers based their opinion of the Australian's affinity with the Papuan, taking hair as their criterion. There certainly is a

resemblance between the Papuan, Melanesian, and Australian native's hair, only when it is in an unkempt and uncared-for condition, adorned with mud, clay, and beeswax; but when washed and well groomed, the Australian native's hair has no resemblance to that of the natives of Papua and Melanesia. The Melanesian's and Papuan's hair, when cared for, is frizzy, not wavy, and closely resembles a guardsman's busby. There are instances of natives of New Guinea whose hair stands out three feet from each side of their head, similar to a sweep's brush. Nowhere in Queensland can a pure Aborigine be found with a head of hair capable of standing frizzily out like this. The African's hair is extremely wiry in stiff, stubby curls, but if allowed to grow *may* be trained to resemble the South Sea Islanders' and Papuans'. I do not think hair can be taken as a criterion of the Aborigine's affinity with the Negro, not in this case, however, any more than a curly-haired Anglo-Saxon or a straight-haired one with Africa or China. The colour of the Australian native's skin, when he is well washed with soap, is dark chocolate colour, never jet black. The Central Papuan is very light in colour, almost yellow, very similar to a Polynesian, with the same type of hair; the coastal Papuan and Melanesian is much lighter than the Aborigine. They are a decided brown. Far away to the North, the South Sea Islander, however, is jet coal black, with Greek classical features.

There are many types of classical features found among the Malayta natives of the Solomons, but they are brown, not black. I do not know the history of kava-making and drinking; it is known in the Duadai country of British New Guinea as Gummunda. The drinking of kava is universal in the Solomon Islands and Santa Cruz. The narcotic use of the areca nut chewed with the betel leaf, with an addition of coral lime, is universal in the Solomons and India; but nowhere among the natives of Australia.

In regard to languages, the claim of Aboriginal affinity to the Dravidian and Papuan languages is the only one than can be seriously considered out of many theories brought forward; yet the likeness is no proof of their geneological connection, nor can it be established that the two stocks are of common origin. The natives of Torres Strait are often termed Aboriginals, or natives of Australia; both terms are very misleading to a person whose experience and knowledge is limited to the Australian mainland Aborigine. The natives of Saibai, Dauan, and Boigu Islands are closely related to the natives of the Duadai district of British New Guinea, and the people on the banks of the Fly River and to the west. Physically, they closely resemble the Papuans; and like

the Trugari of Dutch New Guinea, have a decided Shemitic caste of features. Again, these northern islands geographically belong to the system of Papua; politically, they belong to Queensland. The natives are not like, and in no way resemble, the mainland natives in language and physique, and are more akin in habits, customs, and language and tradition to the Melanesian and Papuan. The Papuans, Melanesians, and Torres Strait natives are, and were, head hunters. Many of them are cannibalistic, though not all. The Murray Islanders were cannibals not so very long ago. The Saibai, Dauan, and Boigu Islanders were head hunters. When they saw a white man for the first time they were in great fear and expressed the same thought as the native of Mota Island. The natives of Saibai called him "Markai," meaning devil or ghost, imagining him to be a being from another world. The Mota term was "Vui," meaning spirit, and thought the white man was a spirit or ghost returned to earth. The Aboriginals were never head hunters, yet in some districts they are still cannibal—that is, to the extent of eating human flesh. The late King John of Yarrabah boasted of eating two white men, three Chinese, one white woman, and a number of Aboriginals. He expressed the opinion that the woman was far more delicate eating than all the others!

The system of extracting human fat from around the kidney is common among the Aboriginals, principally as an act of revenge. Physically, the Aborigine is inferior to the native of Torres Strait, and one would conclude had very little in common. The native islanders are expert agriculturists, erect beautiful houses, and are industrious enough to hollow out great logs for building catamaran canoes with mat sails, ropes, and stays. The "Wap," a dugong spear, many feet in length, made of iron wood, and highly polished, is quite a work of art; also their coral wall fish traps are surprisingly unique. Nothing of the above like nature is to be found among the natives of Queensland.

Voyaging further south from Saibai we find a more European caste of features, so far as to be striking; especially at Yam Island. The old Mamoose Mainau (whether alive or not now, I cannot say) was a decided coloured double of the late King Edward, both in build and features. Throughout the Strait one is amazed at their likeness to many European identities. The whole of the Torres Strait natives are bow-and-arrow people, and also along the western shore of New Guinea. Their war arrows are tipped by long strips of human long bones finely pointed and deliberately poisoned. The process of poisoning is only known to a few, and is handed down from generation to generation.

In the Solomons there is a modified form of poisoning arrows, but arrows tipped with human bone are similar to the arrows of the Straits and Papua. Nowhere have I found Aboriginals using bows and arrows as a means of attack, defence, or fishing.

The Aboriginal nulla-nulla is a very rude weapon when compared with the various shaped clubs of Papua and Melanesia. In regard to the customs, weapons, and languages of Papua and Melanesia, the Australian native may appear in exceptional cases to correspond; but, on the whole generally, the Aboriginals do not agree with their near neighbours. It would seem natural, on the supposition there was once one Aboriginal language which has since, during the ages of time and periods of migration absorbed other influences. The lisping prattle of childish expressions and infant terms of things as they appeared to them, materially alter an original language. Some traces of the original may remain here and there, but the general survey of grammars of Oceania, including marriage laws, to one familiar with either one, will find nothing out of the very common, except euphony, with the grammars of Papua, Melanesia, and Australia; or even a wide contrast of ancient Hebrew marriage laws.

The origin of the Australian Aborigine is still in doubt. Many learned anthropologists have endeavoured to place him. If we take the Tasmanians as a type, that represented the least "infused" in comparison with the hybrid native of the mainland, we are in contact with a branch or sub-branch, of a race that has long passed away. A mystery surrounds them. What was their origin? Had they a link with the old world? If not, are they autochthous, springing unaided from their own soil independent of outside influence? Or were they in the dim remote past carried south, bringing with them their simple arts, such as we see to-day, remaining isolated, stationary, unprogressing, while other people advanced along in various degrees of civilisation.

To us who have twenty centuries of learning behind us yet are only on the threshold of greater far-reaching knowledge, the science of things of the future will be from our present-day point of view, super-miracles. We love to regard mankind as having received the Divine spark of origin, coming from a common source and central point, and then spreading over the face of the earth. It gives us a greater standing to suppose this, rather than like trees to have come into being in every corner of the earth. It is our natural tendency to trace man to a common origin; it is inspiring; yet there is much in the idea that nature, having reached a certain point in

her working, when it was time for man to appear, brought him into being simultaneously as in another part of the world, or perhaps parts. We may imagine time had arrived for man to inhabit the environment which—man feels he may assume it as true—had been prepared for him, and his appearance may not necessarily have been confined to a garden by the Euphrates alone.

There are two considerations to be faced in the fact of man's presence in Australia; one biological and the other cultural. That is to say, is the Aborigine a being indigenous to this Southern land; are his crude arts indigenous or imported? Theologically, it is maintained man derived his origin by inspiration at one definite spot. He must have had a "cradle land" from which the peopling of the world was brought about by migration. Then where was the Aboriginal cradle land? Evidence seems to show that, first of all, the world was inhabited by a general "proto-human form," from which each division of man would thus have had his pleistocene ancestors and would have become differentiated into races by the influence of climate and surroundings. Geology teaches us the existence of land or pre-arrangements of continents and the earth's crust undergone great changes. As far as this southern land is concerned, it was probably connected, by what are now islands of the sea, to the south of Asia. It may be assumed, then, that anthropoid man in the far, far distant ages wandered south, and the present type of the Australian native is a specimen of the original man.

Anthropology and Evolution are but new sciences, and still in the state of flux. It may be established that the Aboriginals' immediate ancestors did come into being in this Southern land, equally as others did in other lands. Close research and exploration may probably bring this to light at some future date.

Turning to the cultural problem of the Aboriginals, it is very crude and primitive when compared with their immediate neighbours of Oceania. Here we find no remains of ancient civilisation or any works of art. The supposed Aboriginal drawing on rocks in Western Australia may have been done by a foreigner. There are no fine specimens of basket work as there are at Santa Cruz Islands, nor anything to be compared with the warrior's shield of Ngala, Solomons. Nor is there anything so fine to be found as the fret-like work of tortoise shell, found in the South Sea Islands.

The Aboriginal nulla-nulla is a very rude sample of the various types of clubs, which are quite a work of art, found both north and east of Australia. The boomerang and womera are the only

weapons approaching anything like art that would command a second glance. There are no ruins to be found in Australia, indicating past greatness and a forgotten cultured race. The lack of this and the presence of a very rude form of art as illustrated by weapons does not explain their connection with other races, nor does it satisfactorily explain the mystery of their origin.

There is scarcely a people in the world which is not, in one way or another, capable of being drawn together in one of the three great divisions of mankind, yet the many theories put forward as to who the Aboriginals of Australia are still remains unsatisfactory. Whoever he is, he is here. To know him in his wild state is to love him. No matter what others have written of his many bad qualities and few good points, one who has lived alone with the natives for a quarter of a century has found the wild chap honest, affectionate, and obedient, childlike in simplicity, full of laughter and fun, but terribly dangerous in anger. The native's brain is capable of absorbing higher learning and putting this knowledge into effect. There are various Aboriginal brass bands conducted by themselves. They read their own music.

In the early days of the advent of the white man they received little or no sympathy; their tribal laws and boundaries were violated, resulting in what appeared to the white man's mind as treachery, but to the native man's sense of justice, as just retribution. For this they were ruthlessly shot down—men, women, and children—by whites who were beyond the arm of Justice. Had they received consideration, the benefit which Papuans and Melanesians enjoyed, had the universities sent out their young men to train and educate them, not leaving that great and noble work for a few with more zeal than education to take up, then to-day our despised "Blackfellow" would have been an asset to Australia.

THE ESTABLISHMENT OF THURSDAY ISLAND.*

By Stanley Wilson, P.M.

In a paper on "The Early Days of Pearling," read before the Thursday Island Sub-branch of the Royal Geographical Society recently, the writer traced the events that led up to the establishment of Somerset in 1863 as a harbour of refuge, coaling station, and entrepôt for the trade of the Torres Strait. The founders of the settlement saw, in prospect, a second Singapore arising near Cape York, a place which owing to its geographical importance was destined to become an important outpost of the Empire. But Somerset did not become a coaling station and was never an entrepôt of any importance. It was merely a Government station, perched on the top of Cape York like St. Simeon Stylites on his pointed pillar. The sea traffic passed around it, but not through it. During the first years of the settlement the value of the Government station was demonstrated chiefly in its usefulness as a harbour of refuge. At that time masters of vessels were not familiar with the navigation of the Torres Strait, and many wrecks were reported in the narrow passage-ways to the north and to the east of Somerset. The shipwrecked crews were assisted by the Government officers stationed at Somerset, and in that sphere of usefulness the settlement justified its existence. But during the period from 1863 to 1870 the trade of Torres Strait was not of any magnitude, and even when the pearling industry was firmly established in the early seventies Somerset did not become an important trade centre. The pioneers of the pearl-shelling industry who voyaged from Sydney in brigs, barques, and schooners brought their own stores and equipment when they arrived at the end of each north-west monsoon, and carried the pearl-shell won by them during the year direct to Sydney in their own vessels when they returned at the close of the south-east season. As a result, very little of the trade of Torres Strait passed through the port of Somerset in its early days.

In 1872, owing to the steady progress of the fishing industry, a change in the method of conducting operations in Torres Strait

*Paper read before the Thursday Island Branch of the Royal Geographical Society of Australasia (Queensland).

was effected by the pearl-shellers. The owners of vessels that sailed up from Sydney each year found that much valuable fishing time was lost in travelling to and from their base, and as a result fishing stations were established on several of the islands in the Strait—the larger vessels being gradually withdrawn from the industry. Trading vessels were now used to bring stores and equipment from South and to carry away the sea produce won, and it soon became evident that the settlement at Somerset was situated too far from the centre of the fishing industry. Somerset had served its purpose as a Government station and as a means of effective occupation of the most northerly portion of the colony of Queensland. But it was now seen that the value of any Government station at the entrance to Torres Strait as a harbour of refuge would gradually become subordinate to its importance as a depôt of trade. As masters of vessels became more familiar with the navigation of the Strait there was greater safety in passing through these waters, especially as beacons had by now been erected on the most dangerous spots and as the natives of the islands had given up their warlike habits. It was recognised that pearl-shelling was to be the main industry of the Strait and that it was necessary to have a Government station on one of the islands. In any case, Somerset was unsuitable as a port owing to the fact that the very strong currents prevailing in Albany Pass did not allow of a good anchorage there. Towards the end of the year 1872 it was decided to search for a suitable station on one of the islands of the Prince of Wales Group.

In October, 1872, Mr. Frank Jardine, who was then acting as Police Magistrate at Somerset, was instructed to visit all the islands of the Prince of Wales Group and to report upon them, with a view to a choice being made of the best site for the new settlement. In his report Mr. Jardine stated that the Tuesday Islands were very small and entirely without water. He visited Wednesday Island and was of opinion that its situation was the only point in its favour; the country was poor and barren, fresh water could be obtained only by sinking wells, and there was a difficulty in securing a good landing except at high water. He reported that abundance of water could be obtained on Hammond Island from permanent springs. On Horn Island there was no surface water, and as the island was bounded on three sides by an almost impenetrable belt of mangroves and by mud flats there would be difficulty in securing a suitable landing. On Friday Island there was a small permanent spring, and on both Thursday Island and Goode Island water could be procured from January

to November, although it evaporated during the heat of the last two months of the year. In Mr. Jardine's opinion the main consideration appeared to be the availability of water. He reported that the natives were evidently averse from the formation of a settlement on any of the Prince of Wales Islands, and that they exerted every ruse and means in their power to prevent the discovery of water. In his report Mr. Jardine did not recommend any particular island as the site of the new settlement, but in later months he favoured the establishment of a station on Friday Island. No immediate action was taken on Mr. Jardine's report.

In 1873 Captain Moresby, of H.M.S. "Basilisk," recommended that the new settlement be established on a site near the north-west point of Hammond Island. In a despatch to Commodore Stirling, Captain Moresby writes of this position alone, and it does not appear that he made any exhaustive investigation of any of the other islands in the Prince of Wales Group.

In 1874, Mr. G. E. Dalrymple, Police Magistrate at Somerset, urged that the new station be formed on the south-west portion of Hammond Island. It was like the juvenile game of "Hot and Cold," with the officials searching for the site and the islands themselves as spectators crying "Warmer, Warmer." In February, 1875, Mr. C. D'Oyly Aplin, successor to Mr. Dalrymple, spent six days in the Prince of Wales Group with a view principally of examining the positions on Hammond Island recommended by Captain Moresby and Mr. Dalrymple. He came to the unexpected conclusion that a site on the western end of Thursday Island was more suitable than either of the other positions. He wrote a comprehensive and business-like report on the respective advantages of Hammond, Friday, and Thursday Islands. He did not attach much importance to the presence of surface springs, stating that the rainfall was so abundant in the wet season that wherever there was any flat land into which it could sink, water could readily be obtained by means of wells or could be stored on the surface in dams and tanks. He was of opinion that the site which best fulfilled the following conditions would be the most suitable:—

1. A secure anchorage at all seasons,
2. Healthy situation,
3. Surface features suitable for buildings,
4. Facilities for obtaining and storing water,
5. Proximity to the general route through Torres Strait.

The site recommended by Captain Moresby near the north-east point of Hammond Island was not regarded by Mr. Aplin as being suitable, for several reasons—a sheltered anchorage could not be obtained in the north-west season, the situation was not a healthy one on account of the cool south-east monsoon being entirely shut out by a high range, and the position was quite unadapted for buildings. The locality recommended by Mr. Dalrymple on the south-east side of Hammond Island was reported against on the grounds that there were no natural features suitable for building purposes, the headland being covered with large boulders, and being narrow and sharp at the summit. Friday Island was not favourably considered on account of there being no building site in the neighbourhood of the one permanent spring. Mr. Aplin came to the conclusion that, for a safe anchorage, healthiness of situation, elevation, natural features suitable for building purposes, and for proximity to the general route through Torres Strait, the north-west point of Thursday Island was superior to any other position in the Prince of Wales Group. On this report it was decided that the new settlement would be formed on Thursday Island, although the exact position of the town that was to be was not chosen until some months later. And thus Thursday Island, the origin of whose name is unknown, came in to its own.

It will be noted that the locality recommended by Mr. Aplin is not that where the town stands at present. It comprised the portion of the island on which the Quarantine Station and the Racecourse are now situated. He was of opinion that there was no completely sheltered anchorage except in the basin-like area bounded by Goode, Hammond, Thursday, and Friday Islands. In March, 1875, Mr. Aplin visited Thursday Island with Captain Ellis, a coast pilot, who sounded the channel (now Ellis Channel) between Horn Island and Channel Rock. Captain Heath, the Portmaster of Queensland, then visitel the island, and favoured an anchorage on the south side. Mr. Aplin again recommended the anchorage on the north-west side of the island, pointing out that there was a strong tide-rip between Vivien Point and Heath Point through which steamers would have to pass before reaching the anchorage on the south side. The main shipping company using Torres Strait was the E. and A. Steam Navigation Company, whose boats called at Somerset, and it was suggested that the final decision regarding the anchorage be reserved until the company had an opportunity of expressing its views on the subject. Evidently the people at Somerset were agitated over the choice of the new site. At a meeting of masters of vessels and others engaged in pearl-shelling

in Torres Strait, held at Somerset on the 28th May, 1875, the following resolution (given verbatim) was passed:—

> "That in the event of the settlement being removed to Thursday Island we suggest the settlement should be placed on Aplin Hill, north-west point of Thursday Island—and the only suitable anchorage for the mail steamers or vessels shall be between Webb and Heath Points, off Friday Island Spit, it being the only anchorage clear of tide-ripplings, and at the same time offering greater facilities for the shipping and discharging of cargo, also facilitating vessels getting underweigh by having more room to turn. We refrain from making any remarks about Ellis Channel, as from experience we think it totally unfit for the anchorage or mooring of large vessels—it being impossible for a vessel to turn or continue her course through the channel."

These uncomplimentary remarks about our present harbour might have had some effect in official quarters in Brisbane, had not Captain Heath insisted that the anchorage should be on the south side of the island. Towards the end of 1875 it was decided to build the new settlement on the position where the town now stands. The erection of Government buildings on the island was commenced in 1876. In August, 1876, an enterprising pearl-sheller put up a building on the beach and was informed that he did so at the risk of having to remove it, as it was proposed to recommend that the whole of the island be reserved for public purposes. It was stated that it was undesirable to have a pearl-shelling station on the same island with the Government staff, especially as there was ample room for the pearl-shellers on the neighbouring islands. The whole of Thursday Island was proclaimed a Government reserve for public purposes in December, 1876. In April, 1877, the Government buildings were ready for occupation. On the 26th July, 1877, Mr. H. M. Chester, Police Magistrate at Somerset, was appointed to a similar position at Thursday Island. He left for the new station in September, 1877, with a coxswain, four water-police constables, a carpenter, and the master and two seamen of the Government cutter "Lizzie Jardine." The officials must have been very lonely at first, for the E. and A. boats continued to use Somerset, and not Port Kennedy, as the port of landing for another three months.

Owing to the policy of not encouraging pearl-shellers to settle on the island, the population of the place did not increase rapidly. In a private letter written by the father of one of the members in November, 1882, it was mentioned that there were then only four

houses on the island apart from the Government buildings. The Hon. John Douglas stated in one of his annual reports that, when he arrived at Thursday Island in April, 1885, there were only a few scattered houses. He added:—"There were two public houses, behind one of which there was a huge mound of bottles testifying to the achievements of those who had lived in the pre-historic times." If the early pearl-shellers were not allowed to live on Thursday Island they evidently visited the settlement frequently.

The policy of exclusion continued until April, 1885, when the Hon. John Douglas was appointed Government Resident. This gentleman had been Premier of Queensland from March, 1877, to January, 1879, and in his official position he had watched the establishment of the new settlement with great interest. On his arrival at Thursday Island he set himself out to encourage people to settle on the island. On the 29th June, 1885, forty allotments were offered for sale by the Government at the Police Office, Thursday Island. On the 14th January, 1886, the first Divisional Board of Torres was formed—Messrs. W. T. Boore, Vivian R. Bowden, and Henry F. Houghton being the first members of the Board. In 1887 it was reported that town properties were of considerable value, and that the owners were confident of the future of the place. In May, 1890, there were 142 houses on the island, in which 526 persons resided. In February, 1892, the population was 1,067, of whom 582 were Europeans.

Up till the year 1886 Thursday Island was entirely dependent on ships for communication with the rest of the world. In that year a cable connecting the island with the mainland was laid by the Eastern Extension Telegraph Company's vessel the "Recorder," and telegraphic communication with Brisbane was established in the next year.

The erection of a jetty was now a matter of considerable local interest. Goods were discharged from steamers in the first instance into a receiving hulk in the harbour, and from there into a lighter. As the value of the exports from Thursday Island in 1885 was £156,618, and that of the imports £41,808, it can be realised that the erection of a jetty was a necessity. By September, 1889, the shore end of a jetty, constructed of rubble stone quarried from the adjacent hillside, was completed to a distance of 400 feet. From that point the structure was built of wooden piles sheathed with copper, the jetty being opened on the 1st May, 1893.

Thursday Island was now firmly established. From 1878 to 1885 it had been practically only a Government station, but after the latter date it progressed rapidly through the far-sighted policy

carried out by the first Government Resident. [It should be noted here that Mr. Hugh Milman, who acted as Government Resident from March, 1886, to November, 1888, while the Hon. John Douglas was acting as Special Commissioner for British New Guinea, did much to carry the new policy of progression into effect.] The Hon. John Douglas wrote the following words in an annual report in March, 1894:—

> "I can now contemplate with no small measure of satisfaction the share which I have been permitted to have in the formation and gradual development of this little island dependency. It was founded by my advice and under my superintendence in 1878. It has been my good fortune to watch its growth, and to share in almost all the important events of its history. I am not conscious of any diminished interest in its welfare, though I am well aware that a time must come when I may be permitted to retire from active service. Whenever that time comes, I feel, with some confidence, that I shall not be ashamed of the work entrusted to me in the later years of my life. Those years have been full of interest to me, and will be regarded, I trust, as not wholly without benefit to this community with which I have been so intimately connected from its very commencement."

He did further useful work as Government Resident until his death in 1904, but the words he wrote in 1894 may be permitted to stand as a faithful record. The community recognises, and will continue to recognise, the great benefits conferred on it by the real founder of Thursday Island.

THE EARLY DAYS OF PEARLING.*

By Stanley Wilson, P.M.

An investigation of the early history of the pearl-shelling and bêche-de-mer industries in Torres Strait is of interest from several points of view. The interest, of course, has a local application for us who live on Thursday Island. The harvesting of marine wealth from the bed of the ocean is the industry that keeps the commercial life of Thursday Island alive at the present time. We have still amongst us several who have watched the gradual growth of pearling during the last fifty years, and many who are the decendants of the early pioneers of the Torres Strait. If the names of these pioneers are familiar to most of us by local association, no less familiar are the names of many of the vessels that were engaged in the industry at its inception—indeed, many of these vessels have left their broken hulks on various reefs in the Torres strait as grim reminders of the dangers of the occupation at a time when those waters were not as well charted as they are at the present day. The adventures and the romance of the industry are still living things for many of us, and therefore no apology seems necessary in bringing a paper of this description before a branch of the Royal Geographical Society established at Thursday Island.

But the history of the fishing industries in the Torres Strait has more than a local application. The early pearl-shellers were colonisers who, unknown perhaps to themselves, demonstrated the capacity of men of the British race for making effective use of territory previously held by savage races. The modern doctrine of territorial rights is based on effective occupation of territory as distinct from its mere discovery. The western islands of the Torres Strait were discovered by Dutch navigators early in the seventeenth century, but no attempt was made by those explorers to occupy any of the islands. Towards the end of the eighteenth century some of the islands near Cape York were discovered by Captain Cook; others were brought under the British flag by the activities of Bligh, Flinders, and King; while the consolidation of the hold of England over the Torres Strait was completed by naval-survey and patrol vessels. But these British navigators made no attempt to establish any bases or settlements on any of the islands. The

* Paper read before the Thursday Island Sub-Branch of the Royal Geographical Society of Australasia (Queensland).

effective occupation of what is now known as the Torres Strait was carried out by the pioneers of the pearling and bêche-de-mer industries who ventured from Sydney thus far north at a time when there was very little settlement on the coast of Queensland north of Brisbane; for Somerset was established in 1863, but the port of Townsville was not opened until 1865, and Cairns was not established until 1876. It was owing to the activities of the pioneers of the industry that the Torres Strait islands were, later, during the period when the Hon. John Douglas was Premier, annexed to the colony of Queensland. Prior to 1879 all the islands in the Torres Strait did not belong to Queensland, and in the early days there was much difficulty in controlling an industry that was carried on partly in our own waters and partly on what was then the high seas. The masters of the early vessels that came from Sydney were not restrained by many laws or regulations, and it is to their credit that they, in general, acted as colonisers without interfering with or inflicting any hardships on the aboriginal natives of the Torres Strait islands.

At the outset it may be pointed out that bêche-de-mer was gathered in these parts at a period long antedating the beginnings of the pearl-shelling industry. As early as the eighteenth century, and possibly earlier still, Malay vessels visited the northern shores of what is now known as Australia for the purpose of collecting bêche-de-mer for sale to Chinese merchants at Timor and other places in the Dutch East Indies. Matthew Flinders records that when he was near Arnhem Land in the "Investigator" on the 17th February, 1803, he met sixty Malay vessels in squadrons engaged in collecting bêche-de-mer. It seems certain that some of these Malay vessels ventured as far as the Torres Strait islands and the Cape York Peninsula. There is evidence of the contact of Malays with the aboriginals of the Peninsula many years before the arrival of white men. Mr. J. B. Jukes, a naturalist on the H.M.S. "Fly," writing in 1843, states that Malays came to the Gulf of Carpentaria in January each year for bêche-de-mer. These Malays did not gather pearl-shell: there was a ready market for the sea slugs near at hand, but the utilisation of pearl-shell was impossible in the absence of markets. There is a record of a vessel arriving at Badu Island from Sydney in 1846 engaged in procuring bêche-de-mer and tortoise-shell, but the beginnings of the pearl-shelling industry date from a much later period. After the first pearl-shellers arrived the gathering of bêche-de-mer became a secondary industry only, and it is with pearling alone that this paper will now deal.

Pearl-shellers did not arrive in Torres Strait in force until

after the establishment of Somerset in 1863. The events leading up to the foundation of that settlement may be shortly traced. There was a fair amount of trade between Sydney and eastern ports viâ the Torres Strait as early as 1847. About that time Gi(a)om, a white woman who had been the sole survivor of a wreck on Prince of Wales Island and who had been forced to live with the natives there for over four years, stated that from twenty to thirty or more ships passed through the strait each summer. The masters of these trading vessels had to contend with the perils of the sea in the form of coral reefs, and also with the warlike nature of some of the natives of the Torres Strait islands. A few instances may be given of the outrages perpetrated by the savages on some of the islands. In 1834 the "Charles Eaton," a 313-ton barque, left Sydney for Canton, but was wrecked on the Barrier Reef near the Sir Charles Hardy Islands. Seven adults and two boys left the wreck on a raft; the adults were killed by natives of the strait and the two boys were taken to an island, probably Aureed. Fifteen other persons who left the wreck on a second raft landed on Boydong Island and were received with all manifestations of friendship, but were afterwards treacherously set upon and beaten to death. In June, 1846, the supercargo and boat's crew of a small fishing vessel from Sydney landed upon Mulgrave Island (Badu), where the supercargo and three men were killed by the natives. There were other atrocities committed by island natives on the castaway crews of vessels wrecked in the strait. As late as 1869 the cutter "Speerweer" went ashore on Friday Island, and nine of the crew were murdered by the natives.

It was partly owing to the murders of castaway crews that Sir George Bowen, the first Governor of Queensland, on arrival at Brisbane in October, 1862, from a voyage of investigation in these parts with the H.M.S. "Pioneer," proposed that a settlement be established at Albany Island (to be named after the Duke of Somerset) "on account of its geographical importance as a harbour of refuge, coaling station, and entrepôt for the trade of Torres Strait and the North Pacific." The Imperial and the Queensland Governments approved of the proposal, and John Jardine, police magistrate at Rockhampton, was appointed Government Resident. Mr. Jardine decided on a site on the mainland opposite Albany Island, and Somerset was established there. The necessity for the settlement is shown by the fact that from the formation of a harbour of refuge at Somerset in 1864 fourteen vessels were wrecked in the Torres Strait in the next eleven years. Five barques, four brigs, three schooners, and two cutters were lost, seven of the vessels belonging to Australian ports.

After the settlement at Somerset was formed, the pearl-shelling industry was established by adventurous spirits who were willing to run great risks to obtain some of the wealth of shell that had been accumulating for ages. The first Australian vessels to engage in the industry were brigs, barques, and schooners that came from Sydney. Those vessels were necessarily of fair tonnage, because all stores and equipment had to be carried from Sydney. The masters had many difficulties to contend with in waters so far away from their bases, but the rewards to be obtained were enticing. The pearl-shell had been lying at the bottom of the ocean for countless ages, growing to maturity and then slowly rotting away. When the earliest shellers arrived on the scene some wonderful catches were obtained. Shells were secured weighing up to 10 and 12 lb. in weight. The value of the shell taken in the year 1871 amounted to £25,000. The schooner "Kate Kearney" discovered a rich patch of shell in January, 1872, and was getting 2 tons in three days. The captain of the barque "Australian Packet" heard the news and ran down for his share, and between them they gathered 21 tons in less than a fortnight. In March of the same year the schooner "Melanie" discovered a fresh patch of shell near Warrior Island, from which 13 tons of shell were taken. The shells were of a fine description, averaging 610 to the ton. It must be remembered that only the shallow waters could then be prospected, as diving was done by swimmers (mainly South Sea Islanders), diving dresses not being introduced until 1874. There was much rivalry between the pearling boats in the search for fresh patches of shell. It is related that one fishing party discovered a rich patch of shell, and wishing to keep it solely to themselves made a practice of hoisting the quarantine flag whenever opposition boats were seen cruising in the neighbourhood. On one occasion the captain of a rival station came alongside and inquired why the yellow flag was flying. In answer he was told that smallpox had broken out on board the vessel, from which ten men had already died and that fifteen men down with it were not expected to live. The visitors were frightened away, and the men who were not expected to live collected a ton of shell before dark.

There was much excitement in the industry in those early days. The natives were still wild on some of the islands, and some of the persons in charge of fishing vessels were just as wild. Although there was a settlement at Somerset there was no effective patrol of the Strait in the early seventies. A few instances of the pleasant life in the Strait at that period may be given. Towards the end of 1871 two West Indian blacks bought a long boat at Somerset and settled on Murray Island, where, with the help of natives, principally

women taken by force from other islands, they carried on bêche-de-mer fishing. They became a terror to natives of the smaller islands, and in an affray with the Cocoanut Islanders they shot one of them. The Cocoanut Islanders could give as well as take. About the same time a canoe belonging to the Warrior Island natives was capsized and some of them were drowned. The natives, as is customary in such cases, proceeded to determine by certain magical ceremonies who were the parties that had by their incantations caused the disaster. The lot fell on the Cocoanut Islanders. Accordingly, two or three canoes full of warriors were deputed to punish the offenders, but to their astonishment they were received with a dropping fire of musketry which compelled them to beat a hasty retreat. To return to their tribe without a head or two would have been a disgrace, so the Warrior Island men surprised some other island and killed two old men.

The Cocoanut Islanders had appreciated the advance of civilisation and had previously obtained some muskets and ammunition from a pearling vessel. A unique method of inducing natives to work in the industry is related in an old document. It is stated that the mate of a pearling vessel compelled some islanders to dive for shell by firing at them with a revolver from the deck of the vessel. But the early pearl-shellers, in general, conducted their business with an considerable amount of restraint.

In the early days the pearling industry in the Torres Strait was in no ways a Queensland one. It has been stated that the earliest vessels came from Sydney. The first boat to arrive from any of the colonies other than New South Wales was the cutter "Peveril," which arrived at Somerset from Melbourne in April, 1872. Even as late as 1874, of fifty-eight vessels and small boats engaged in the industry only eleven represented Queensland interests. Prior to June, 1872, there was no regulation of the Pacific Island labour employed in the industry. The pearl-shellers were subject to little control and they conducted their business at their own sweet will, unhampered by any laws, when outside the limits of what were then the boundaries of Queensland. Many South Sea Islanders were employed as divers and crew. A Polynesian Labourers Act had been in force in Queensland since 1868, but such Act applied only to the colony of Queensland. By the terms of the Letters Patent of the 6th June, 1859, constituting Queensland, the colony consisted of that portion of the mainland which is now Queensland "together with all and every the adjacent islands their members and appurtenances in the Pacific Ocean." After the establishment of the settlement of Somerset the adjacent

islands in Torres Strait were, for the purpose of administration, considered to be those within 60 miles of the mainland, and thus the greater portion of the fishing grounds were beyond the limits of the colony of Queensland. On the 27th June, 1872, the Imperial Pacific Islanders Protection Act (popularly known as the Kidnapping Act) was passed. It applied to all British vessels on the high seas. According to the terms of that Act, any ship that carried without license native labourers of islands in the Pacific Ocean not being in Her Majesty's Dominions nor within the jurisdiction of any civilised power, was liable to be condemned and forfeited. By section 16 large powers were given to military and naval officers. One of the naval officers was not slow to bring the Act into force in Torres Strait. The H.M.S. "Basilisk" arrived at Cardwell on the 2nd January, 1873, and Captain Moresby was there informed that the pearl-shellers had received warning that the Kidnapping Act was in force and that they knew of the coming of the "Basilisk" and were clearing out of the Strait as fast as possible. Captain Moresby determined to make all haste north. On the 5th January two schooners, the "Melanie" with fifty-five South Sea Islanders on board, and the "Challenge" with thirty-three on board, were captured and taken to Fitzroy Island. After investigation the vessels were sent to Sydney as prizes and were there condemned, but on a subsequent appeal to the Privy Council the vessels were restored, on paying all costs connected with the case, on the grounds that retrospective evidence could not be entertained and that an intention to procure a license had been proved. On the 8th January the barque "Woodbine" was seized, having three South Sea Islanders on board without license. The vessel was sent to Sydney, but was released for want of sufficient evidence. On the 14th January, Captain Moresby boarded the barque "Crishna" and found thirty-seven South Sea Islanders on board. The vessel was taken to Brisbane, and there Mr. Griffith, afterwards Sir Samuel Griffith, applied to the Vice-Admiralty Court for the release of the vessel on the grounds that the South Sea Islanders on board were members of the crew of the schooner "Active" which had been lost in the north of the Strait, who were being taken from Darnley Island to Sydney as passengers at their own wish. The vessel, however, was condemned and sold by auction.

After the seizure of these vessels the conditions regarding the securing of native labour became more settled, although there were still no laws dealing with the rate of pay such labourers were to receive or with the actual conditions of working.

An unpublished review of the conditions of the industry in

1874, written by Mr. C. D'Oyly Aplin, police magistrate at Somerset, gives some interesting facts. The year was a fairly prosperous one for shellers, few of whom, however, were Queenslanders. The area then being worked for shell was roughly 3,000 square miles in area, but it did not include the deeper waters near the islands in the north-east of the Torres Strait. As the diving had been carried on by swimmers, only the shallower depths had been prospected, but in 1874 diving dresses were introduced and it was expected that the deeper waters would then be exploited. The writer of the report states:—

> "So little is known of the conditions which are favourable to the growth and development of the pearl-oyster and so various are the characters of the bottom where it has been found—sand, broken shell and coral, rock and rocky ledges—that it would be impossible to say how much of the untried area may prove to be profitable when properly explored."

Although Messrs. Saville Kent and Tosh made investigations in later years, we still know very little about the conditions favourable to the development of the pearl-oyster, but it is confidently anticipated that when the recently formed Barrier Reef Committee prosecutes its inquiries in a scientific manner we shall know a great deal more about the subject. The report shows that in 1874 there were 18 vessels and 40 boats engaged in the industry, employing 707 men. Of these, only two small vessels with a total capacity of 36 tons (the cutter "Swift" and the schooner "Economist") and nine licensed boats employing 85 men represented Queensland interests. Fifteen vessels, aggregating 1,270 tons, and 31 boats employing 624 men, belonged to New South Wales. The brig "Franz" and the cutter "Ida" flew the German flag. A list of these vessels is given in an appendix to this paper. During the year 137 tons of live shell were obtained, the price in Sydney being from £205 to £210 per ton. The value of the produce of the fishing industry for the year was £30,000. The natives were paid ten shillings per month in trade, and the report states that in general they were well treated by the masters of the vessels. When diving dresses were introduced during the year, white divers were employed at first. Towards the end of the year the Sydney owners contemplated withdrawing their larger vessels from the fisheries, as a regular mail service had been established with Somerset, enabling supplies to be forwarded, and were establishing fishing stations on various islands as headquarters for small boats. There were already fishing stations on Warrior Island (Merriman), Jervis Island (John Bell), Mt. Ernest Island (F. L. Jardine and C. E. Beddome), and Prince of Wales Island (E. I. Brown).

The industry now progressed rapidly. In May, 1877, there were sixteen firms engaged, employing 109 vessels and boats, 700 natives, and 50 Europeans. The quick advance made in the utilization of improved methods of diving is shown by the fact that in 1877 sixty-three boats were fitted with diving apparatus.

It had now become apparent that the settlement at Somerset was too far from the centre of the fishing industry, and it was decided to establish a new settlement on one of the islands. Thursday Island was chosen as the new base. Mr. Chester, police magistrate at Somerset, shifted his headquaters to Thursday Island towards the end of 1877, and the new settlement was opened in 1878. After the establishment of Thursday Island we arrive at more modern conditions. The industry became properly regulated, and it must be confessed that much of the adventure and romance of former times vanished with more settled conditions. A Pearl-shell and Bêche-de-mer Fishery Act was assented to on the 15th September, 1881, and after that date there was no further trouble in engaging and employing natives, and the industry became entirely a Queensland one. By "*The Queensland Coast Islands Act of* 1879" the whole of the islands in the Torres Strait were added to the colony of Queensland, and there were no further difficulties regarding jurisdiction.

The subsequent history of the industry may be referred to in a few words. In 1885 there were 195 boats and vessels engaged, and the shallower depths were already becoming worked out. In 1886 a large portion of the fishing fleet left for what were then considered to be the more prolific banks on the north-west coast of Australia. By 1886 90 per cent. of the divers belonged to coloured races, and some of the natives of the more western islands had commenced diving on their own account. But it is interesting to note that in an official report it is mentioned that in 1889 the most successful shellers were white men who dived themselves, Messrs. Anderson, Tolman, Sinclair, and Dann-Koles being men of this type. An influx of Japanese divers now set in, and in 1893 there were 498 Japanese employed in the industry. The continuous stream of Japanese immigration drove away many of the South Sea Islanders, who were regarded as the best seamen then in the Strait. By 1893 there was a marked change on the methods of pearling. Floating stations were introduced by pearl-shellers from Western Australia, and fewer luggers came to Thursday Island as their head station. The "Wanetta" and the "Tarawa" were the last representatives of these floating stations. Towards the end of the year 1905 a very considerable portion of

the shelling boats left the strait for the Aru Islands. Most of the shellers who had left for Western Australia and the Aru Islands must have eaten of the fruit of the wongi, for they returned in later years. After 1905, Papuans became engaged in the industry as crew in increasing numbers. The condition of the fishing industries after that date is too recent for any historical reference.

I have endeavoured to trace shortly the history of the pearling industry in the Torres Strait from its inception up to times still within the memory of most of those now engaged in the industry. The main points to be noted are: Firstly, the great amount of initiative and courage shown by the early shellers who came north to work grounds that were 2,000 miles from their base; secondly, the fact that, if these adventurous spirits had not occupied Torres Strait, it would have been difficult to have prevented seamen of other nations from doing so; thirdly, the rich harvest that was won by those pioneers of the industry when the pearl-shell beds were first exploited; fourthly, the difficulties experienced by the authorities in controlling an industry that carried on partly in Queensland waters and partly on the high seas; and lastly, the fact that when diving dresses were first introduced white divers were employed.

And now in conclusion. After the industry was firmly established many of the pearling boats left Torres Strait at various times because it was thought that the pearling grounds were becoming worked out. But it is now generally considered that the pearl-oyster does not take as long to come to maturity as was fomerly thought, and that owing to the continuous growth the beds are not likely to become depleted. But it is necessary for us to know more about the conditions that are favourable to the growth and development of the pearl-oyster. And that knowledge can be supplied only by scientific investigation. Perhaps in a hundred years' time some member of the Royal Geographical Society of the new State of Carpentaria will be reading a paper in the city of Thursday Island, describing the late pioneers of the year 1924. A pioneer is one who goes before, preparing the way for others to follow, and in a hundred years' time the methods of obtaining pearl-shell will doubtless have been so improved by means of scientific investigation that the shellers of the present day will be regarded as part of the romance of the unfamiliar past. For history is continuous, and each day we all become part of the past.

APPENDIX.

List of vessels and masters engaged in pearl-fishing in Torres Strait fifty years ago:—

Name of Vessel.	Description.	Tons.	Master.
Susannah Booth	Schooner ..	111	W. B. Ware
Storm Bird..	Schooner ..	94	J. Hastings
Pacific	Schooner ..	60	Pearson
John S. Lane	Schooner ..	82	Chapman
Lady Denison	Brig	129	Walton
Margaret and Jane	Schooner ..	51	McAuley
Australian Packet	Barque ..	179	Hovell
John Bell	Brig	208	Frazer
Franz and Ida	Brig and Cutter	148 and 24	Redlich
Crinoline	Schooner ..	63	Pennefather
Retrieve	Ketch	24	Thompson
Root Hog or Die	Cutter	24	Tucker
Three Brothers	Schooner ..	77	Scott
Swift	Cutter	10	Dudfield
William and Mary	Ketch	14	Parkyns
Wikinyen	Schooner ..	7	McCourt
Economist	Schooner ..	26	V. Uslar

ROYAL GEOGRAPHICAL SOCIETY OF AUSTRALASIA (QUEENSLAND).

* Report by the Honorary General Secretary and Treasurer on the Opening of the New Provincial Session, 1925-26.

I have the honour of reporting, for the information of the Council, that the provincial session was opened at Toowoomba on the 24th February, when Archbishop Duhig, D.D., F.R.G.S.A., lectured to a full house in the Town Hall on his visit to Papua, the subject being profusely illustrated by a very fine series of lantern views. On the following evening His Grace repeated the lecture at the Town Hall, Warwick, before a large audience that filled the commodious building to its utmost capacity. On the 2nd March the lecture was again repeated in the Town Hall, Ipswich, to a large and representative audience, every seat in the building being fully taken up, while many in the vestibule were left standing. Realising the vital importance of the movement to the very existence of the provincial branches at large Dr. Duhig, at great personal inconvenience, arranged to repeat his lecture at Maryborough and Bundaberg on the 9th and 10th instant to very large gatherings in the Town Hall and Queen's Theatre. At all centres, except Ipswich, the lecture was preceded by a civic reception, the hope being generally expressed that the lecturer's position of Acting President would be made permanent at the annual election of officers. Any way the view was freely expressed that the session was one of the most successful in the history of our provincial work, and in the light of some little personal experience I can only add that the general public estimate of the movement was not at all extravagant. For my own part it was a

* The Acting President (His Grace the Most Rev. Archbishop Duhig, D.D., F.R.G.S.A.) and Council of the Royal Geographical Society of Australasia (Queensland), at a meeting held at Headquarters, Brisbane, on Thursday, the 25th March, 1926, unanimously resolved (on the motion of the Hon. W. F. Taylor, M.D., F.R.G.S.A., Vice-President) that the following Report by the Honorary General Secretary and Treasurer, and Leading Article published in the Maryborough "Chronicle" of the 10th March, 1926, should be included in the Records of the Society for the information of the members.

delightful sensation to feel that the interests in our activities is spreading, and that the people appreciate the efforts put forth in the endeavours of our active co-operators to stimulate the educational and intellectual life of the State and disseminate geographical knowledge among all classes of the rural communities. To me a marked feature of the session was the unusually close attention given to the lecture at all the centres, especially by the young people from the secondary schools, and even those in the lower forms scrambled to gain admission to the hall and were in no hurry to get way at the conclusion of the programme. This was quite a novel experience in our provincial movement. But the reason was not far to seek, for apart from the personality of the speaker the lecture could be followed without difficulty, the subject being free from cryptic and obscure technicalities delivered in an attractive form, and the scientific aspects of the discourse presented in a clear, popular manner. This, to my mind, is of the very first importance in any movement for the diffusion and dissemination of knowledge among men; and especially so in a comparatively young country like Australia, where the vast bulk of the people have no scientific training, and generations must pass before we are able to raise an audience of scientists capable of following and appreciating any technical or abstruse discourse. It is, indeed, only too true that many of the scientific publications produced in this country remain a "sealed book," and are never read for the simple reason that they are entirely devoid of literary attraction, and no matter how high an authority their authors may be the materials they contain are so obscure and unattractive that few can readily follow them, and so it is that they defeat their own object and the interests of science suffer through lack of adequate public support.

The term "science" or "scientific" is becoming so commonly used in so many lines of human activity—cricket, football, billiards, tennis, golf, bowls, fisticuffs, gambling, &c.—as to lose its original significance and be regarded as meaningless. The word "knowledge" conveys to the human mind a wider and more perfect field, more readily comprehended, apter and more appropriate in its application and less likely to be abused. And in its elucidation the attractive aspect of the subject should be constantly kept in view. Surely no one can deny that the surface of a mirror or speculum becomes all the more effective by polish, that precious stones and metals increase their value by the art of the lapidary, and when offered to the public in an attractive setting become popular and command high prices. This is the view I have advocated in our work for years after studying the position locally and in other countries, but more especially in the light of my own earlier experience, when it became clearly apparent to me that speaking to empty benches was not the way to

serve the best interests of the Royal Geographical Society or advance geographical knowledge. And even limited to recent events, the remarkable success of our opening session in the nearer provincial centres is a striking confirmation of the policy of popularisation.

The far Northern branches have not yet been included in the new sessional programme, but if possible His Grace the Acting President will make a special effort to repeat his lecture to the Rockhampton and Mackay branches in May, and afterwards I will personally co-operate with the Cairns and Townsville branches so as to start the sessional work there, according to promise. But whether or not it will always be essential for me to keep in personal touch with all of the branches, otherwise local interest in the work will inevitably flag.

In conclusion, I have to thank the Acting President for personal kindness to myself, while the great support he is giving to the provincial movement merits the Council's warmest acknowledgment.

The cordial thanks of the Society are due to the provincial Press generally, but more especially to the Maryborough "Chronicle," for their enlightened reports of our sessional work.

J. P. THOMSON.

25th March, 1926.

Leading Article Reprinted from the Maryborough "Chronicle" of Wednesday, 10th March, 1926.

ROYAL GEOGRAPHICAL SOCIETY.

The visit of Dr. Duhig and Dr. James Park Thomson, C.B.E., Honorary Secretary and Treasurer of the Queensland Branch of the Royal Geographical Society, emphasises afresh the very valuable work which this body and the public-spirited men behind it are performing, not only in the name of science, physical and natural, but in the interests of the country generally.

Broadly speaking, the Society has dedicated its efforts to the dissemination of knowledge amongst its own people, and the exchange of information with outside countries by a comprehensive system of up-to-date publications and lectures, based on the observations, treatises, and works of the best authorities in the world, and on the results of its own activities, which occupy a very important place in the life of the Society.

The keen, analytical, and scientific minds behind the Society's labours is the best possible assurance that what it broadcasts as helpful

and informative information on any subject is founded on fact. That is why publicists and educationalists have so much faith in its activities, which embrace practically an inexhaustible field for exploitation. That is better understood when it is remembered that it is constantly carrying on research in various phases of ethnology, geology, agriculture, pastoral and rural conditions, and commerce, in addition to studying the physical features of the country generally.

The Australian section of the Royal Geographical Society was founded in Brisbane forty-one years ago by Dr. Thomson, who has devoted a lifetime of invaluable service to its advancement, with the spirit that courts no reward, monetary or otherwise, but carries a man ever onward to his goal in an atmosphere of love for his work, devotion to, and faith in a high ideal. That has always been characteristic of Dr. Thomson's labours; indeed, it is traditional of the Society.

Briefly, these men count national service and their labours in the cause of science, generally, infinitely higher than personal gain or preferment. That spirit is ennobling and inspiring. Though there is no seeking after reward, it is good to know that their efforts are deeply appreciated, and it came as a very graceful and well-deserved tribute, on the part of the British authorities, when Dr. Thomson a few years ago was created a Commander of the British Empire. He is thereby entitled to the letters C.B.E. after his name. He has well earned them.

Since its foundation the Society has gradually spread. It now has eleven branches in Queensland, with a membership of 600—the largest in Australasia—at Thursday Island (the smallest, but probably the most active), Cairns, Townsvile, Mackay, Rockhampton, Bundaberg, Maryborough, Gympie, Ipswich, Toowoomba, and Warwick, with headquarters at the old Trades Hall in Brisbane, where also are housed the Council of Agriculture and the Teachers' Training College. The Society is affiliated with London, Manchester, Edinburgh, and the leading European and American bodies, so that members on tour abroad may enjoy all the privileges of other societies, with the exception of voting.

In furtherance of its educational activities, the Society publishes from headquarters a periodic journal, called "The Queensland Geographical Journal," thirty-nine volumes of which have already been issued under the able and experienced editorship of Dr. Thomson. This journal is circulated throughout the various branches. In addition, an edition is published for circulation amongst branches throughout the world, and in public libraries and leading State departments. Its letterpress contains mainly a list of members and selected lectures delivered throughout Queensland. In return for this courtesy the Society is favoured with similar exchanges from abroad, from which the parent body at Brisbane

has built up one of the largest and most complete geographical and scientific libraries in the Commonwealth, comprising nearly 30,000 volumes.

Headquarters therefore is really a vast storehouse of very valuable information and indispensable knowledge. The aim of the Society is to utilise this for the benefit of the State generally. In the preparation of lectures its leaders are thus able to seek inspiration from the highest authorities in the world.

Sir Matthew Nathan, late Governor of Queensland, had an abiding enthusiasm for the work of the Geographical Society, evidenced in his keen interest in the exploration of the Great Barrier Reef and the numerous intellectual lectures he delivered throughout various centres in Queensland. His mantle as President of the Society has temporarily fallen upon Dr. Duhig, pending the appointment of a successor. His Grace brings to his new sphere of labour a keen and intelligent sympathy with the objects of the Society, a highly trained mind, and the inestimable value of considerable research, quite apart from his personal observations during the course of his travels abroad. Last year he paid a visit to Papua or British New Guinea, and has embodied his observations and study of the customs and habits of the people, settlement, communication, historical records, and many other sidelights on this island, into an exceptionally interesting lecture, enhanced by a series of beautiful lantern slides, and the gift of oratory, which finds an outlet both in clarity of expression and diction.

Those were the salient features of his lecture in the Maryborough Town Hall last night. It was highly educational, and created a fine impression, for it gave the large audience present a better conception than they had hitherto held of life and conditions in Papua, and of its strategic importance as an outpost of the Empire. Lectures of this nature, and by men who have a thorough grasp of their subject, help to make the Geographical Society a vital force in the life of Queensland and of Australia.

Civic Reception tendered to Delegates from the Royal Geographical Society.

(Reprinted from the Maryborough "Chronicle," 10th March, 1926.)

SOCIETY'S GREAT WORK—EDUCATIONAL AND ENLIGHTENING.

A civic reception was yesterday tendered to His Grace Archbishop Duhig and Dr. Thomson, who arrived by train from Brisbane in connection with His Grace's lecture at the Town Hall last night, under the auspices of the Royal Geographical Society.

The Council Chamber was comfortably filled by a representative gathering, and the reception took place shortly after 5 p.m., Alderman D. Weir, as Deputy Mayor, presiding. An apology was received from Mr. R. J. V. Jones, B.A., head master of the Boys' Grammar School.

Educational Work.

Alderman Weir briefly opened the function by stating that the Archbishop was acting in the capacity of President of the Society in Queensland, while Dr. Thomson had rendered long service. Mr. Weir said that, as one who believed that nothing educational should be neglected, he was glad to welcome the Archbishop and to arrange the function. The Royal Geographical Society lectures were always profitable, and the hearers went home satisfied. The speaker then told of research work at the Barrier Reef by University students a couple of years ago, and how these activities were contributing to the advancement of the people. He hoped there would be a good attendance at the lecture in the evening, and that Archbishop Duhig and Dr. Thomson would be rewarded.

Alderman H. F. Barker endorsed the chairman's remarks, and said that anything educational tended to enlighten the people beyond their narrow surroundings and to broaden their minds.

Mr. Justice Brennan, when asked to speak, expressed pleasure at being asked by Dean McCarthy to be present. The Royal Geographical Society members were doing much in their observations as they travelled and their subsequent lectures. He knew of the work of the Archbishop, and would look forward to his visit to the Central district.

A Land of Interest.

His Grace, in responding, was received with warm applause, and said he very much appreciated the reception extended to Dr. Thomson and himself. He was delighted to find that the Deputy Mayor expressed such sentiments regarding the educational advantages of the Society in arranging the lecture. There still remained a great deal to be done, there having been no complete survey of the country according to the Archbishop. He was going to speak of a land Australia had had the pleasure of colonising, and which was filled with such deep interest, because Australia was to a large extent responsible for the development of Papua. Australia was supplying the brain power and the sinews to develop that land.

Tribute to Maryborough.

He was delighted to come to Maryborough, and he had a high esteem for this model city, with its well-kept streets, public buildings, and unrivalled public gardens. Maryborough had always been an educational centre, and had in the past contributed its quota of capable men to the State, including members of Parliament, and now a judge. The city was in the front rank industrially, its contentment and prosperity being noticeable. His Grace did not know of any parallel example of public-spiritedess as that of the gift of the magnificent Town Hall by the late Mr. G. A. White. Dr. Thomson would tell of the aims of the Royal Geographical Society, and in the doctor they had a member of over forty years' standing in the Society.

Dr. Thomson spoke at length, telling of the aims of the Society and the work being done by its members. He said that His Grace and himself were lecturing quite on their own, in that they received no expenses or remuneration whatever. The doctor referred to the twenty-five years' service rendered by the Hon. A. Dunn (Maryborough) to the Society, and concluded by emphasizing the advantages of membership.

Before the function closed the Hon. A. Dunn, as President of the local Branch of the Society, sincerely thanked the Deputy Mayor for arranging the welcome.

A vote of thanks to Alderman Weir for presiding, proposed by Justice Brennan, was carried heartily.

Proceedings of the Royal Geographical Society of Australasia (Queensland).

FORTIETH ANNIVERSARY MEETING AND CONVERSAZIONE, 31st AUGUST, 1926.

His Excellency Rt. Hon. Sir Matthew Nathan, P.C., G.C.M.G., F.R.G.S., President, in the chair.

The minutes of the previous monthly meeting of the Society were taken as read and duly confirmed.

Special communications were read by the Hon. General Secretary and Treasurer, as follows:—

"Governor-General, Commonwealth of Australia,
"Melbourne.

"SIR,—I greatly regret that it is impossible for me to be present at the Fortieth Anniversary Celebration of the Royal Geographical Society, as I should have been glad to attend one of the Annual Gatherings of a Society with which I have been associated throughout my term of office as Governor-General.

"I have followed closely the good work of the Society, as revealed in 'Journal' and the 'Transactions,' and I have taken great interest in its more recent activity in connection with the scientific investigation of the Great Barrier Reef.

"I rejoice to hear of the continual growth of the Society, and the extension of its work and scope. I should be glad to promote its interests in any way open to me, and I trust that the importance of its work will be recognised, appreciated, and supported throughout Australia.

"With cordial good wishes,

"I am,

"Yours sincerely,

"(Sgd.) Forster.

"The Secretary,
"Royal Geographical Society of Australasia (Queensland)."

"Prime Minister's Department,
"Melbourne.

"Dear SIR,—I am directed by the Right Honourable the Prime Minister to acknowledge the receipt of your letter of the 4th August regarding the Fortieth Anniversary Celebration of your Society, at which it is intended to do special honour to the President, Sir Matthew Nathan.

"Although unable to be present in person, the Prime Minister will certainly be with you in spirit on that occasion, and hopes that you will have a most successful and enjoyable gathering.

"Yours faithfully,
"(Sgd.) Jas. Scott Halliday,
"Private Secretary.

"Dr. J. P. Thomson, C.B.E.,
"Hon. General Secretary and Treasurer,
"Royal Geographical Society of Australasia (Queensland),
Brisbane."

Dr. E. S. Jackson, Messrs. J. P. James, C. E. Sinclair, J. Young, and L. A. Pares were duly elected members of the Society.

The Hon. General Secretary and Treasurer read the Report of Council (page 127), accompanied by the Financial Statement for the year, duly audited (page 129), and gave notice of motion for next Annual General Meeting in favour of the appointment of an Hon. President of the Society.

The Report and Balance-sheet were unanimously adopted.

The officers and Council were then elected for the Session 1925-26, as follows:—

Patron:

His Excellency Rt. Hon. LORD FORSTER, G.C.M.G., Governor-General, &c.

Vice-Patron:

Rt. Hon. S. M. BRUCE, D.C.L., M.C., C. de G., Prime Minister.

President:

His Excellency Rt. Hon. Sir MATTHEW NATHAN, G.C.M.G., LL.D., F.R.G.S., &c.

Vice-Presidents.

His Grace Archbishop Duhig, D.D., F.R.G.S.A.
Hon. W. F. TAYLOR, M.D., F.R.G.S.A. Hon. W. N. GILLIES, M.L.A.

Hon. General Secretary and Treasurer:

J. P. THOMSON, C.B.E., LL.D., Hon. F.R.S.G.S. (Edin.), &c.

Other Members of Council:

B. DUNSTAN, Esq., F.R.G.S.A.
F. B. FORD, Esq., F.R.G.S.A.
A. HERTZBERG, Esq.
Rev. THOS. LOOSE.
F. J. MORGAN, Esq.
Prof. H. C. RICHARDS, D.Sc.
L. A. WILKINSON, Esq.

The President then presented the Diploma of Fellowship to His Grace Archbishop Duhig and Professor H. C. Richards. In the absence of the latter the Diploma was received by Mrs. Richards. Both recipients returned thanks.

The Hon. General Secretary and Treasurer read a Farewell Address to the President (page 130), who, at the same time, received the award of The Thomson Foundation Gold Medal and the Honorary Diploma of Fellowship, the presentations being made by the Hon. W. F. Taylor and Archbishop Duhig, respectively.

The President responded, returning thanks, and delivered his farewell Anniversary Address (page 1).

In conclusion the following resolution was moved by His Excellency the President (Sir Matthew Nathan, P.C., G.C.M.G.), seconded by His Grace Archbishop Duhig, D.D., F.R.G.S.A., supported by the Hon. Dr. Taylor, F.R.G.S.A., and carried by acclamation:—

> *"Resolved that this meeting of the Royal Geographical Society, on the occasion of the Fortieth Anniversary of its foundation by Dr. James Park Thomson, desire to place on record their appreciation of the splendid energy, determination, and capacity that he has brought to the Society's work, and that have made it a great Australian institution for the advancement and popularisation of scientific knowledge."*
>
> *" . . . His Excellency the Governor-General (Lord Forster) is very pleased to know that this mark of appreciation of the public and scientific services rendered by Dr. Thomson has been placed on record. His Excellency, as Patron of the Society, has great pleasure in endorsing the Resolution, and desires Dr. Thomson to be so informed."*
> —*Extract from the Governor-General's letter, dated 14th September,* 1925.

This having concluded the formal business, the meeting adjourned for refreshment. Special musical selections were provided by Messrs. Erich John (piano), and L. A. Pares (violin), the latter being accompanied by Miss Anderson. Mr. Fred Homer (vocalist) also assisted in the entertainment.

ANNUAL SUMMARY 1924-25.

In summarising the operations of the Society during the Fortieth Session, now brought to a close, the Council notes with much gratification that there has been a substantial increase of membership, numbering over 100 subscribers, while the general activities have been greatly extended throughout the State. The establishment of new Branches at Cairns, Townsville, and Rockhampton may, with those existing in other towns, be considered as a fairly full representation of the Society's interests in the more important Provincial Centres, and increases the number to eleven altogether. At Rockhampton the Branch was fortunate enough to secure as its chairman Mr. W. H. Rudd, an old and greatly valued member, whose former generous donation of £50 to the funds of the Society has been augmented by an additional gift of £100, placed at the disposal of the local Branch for the purchase of an up-to-date lantern of the most approved type, together with slides, maps, and other Geographical appliances.

The Addresses given at the Headquarters of the Society in Brisbane included:—

(i.) "Australia to Geneva," by Sir Littleton E. Groom, K.C.M.G., K.C.

(ii.) "Geographical Conditions in Northern Australia and their Relation to Polar Research," by Captain G. H. Wilkins, F.R.G.S.

(iii.) "Captain Cook and Bustard Bay," by Dr. F. W. S. Cumbrae-Stewart.

(iv.) "The Peoples of Palestine," by Lieutenant-General Sir Henry Chauvel, G.C.M.G., K.C.B.

To the authors of these important addresses the cordial thanks of the Council are due.

To the Provincial Branches at Toowoomba, Warwick, Bundaberg, Maryborough, Gympie, and Ipswich, Captain Arnold Wienholt, D.S.O., M.C., repeated his popular lecture on "Primitive Man as a Hunting Companion" (*see* "Queensland Geographical Journal," Vol. XXXIX., p. 63), there being large and appreciative audiences at all, the lecture at Toowoomba, Warwick, and Bundaberg being preceded by a Civic Reception. There was also a repetition of Captain H. M. Saunders' lecture on "A Patrol in Papua" (*see* "Queensland Geographical Journal," Vol. XXXIX., p. 22), at the Ipswich and Toowoomba Branches.

The first volume of the Society's "Transactions" containing the "Reports of the Great Barrier Reef Committee" has been printed and sent out to all of the members and to foreign exchanges.

The work of the Joint Place Names Committee has been summarised in a report now ready for publication, and which it is proposed to include in the next issue of the "Journal," if available, so as to be at the disposal of members of the Society and exchange bodies.

The annexed Balance-sheet, duly audited, shows a credit of £117 11s. 1d., from which the cost of printing the last issue of the "Journal" should be deducted to show the actual financial position of the Society at the end of June, 1925.

The Council recommend to the Society—

(*a*) That the Diploma of Fellowship be conferred upon His Grace Archbishop Duhig, D.D., a Senior Vice-President, esteemed Life Member, and enthusiastic supporter of many years' standing; Professor H. C. Richards, a greatly valued Member of Council, lecturer, and contributor to the "Journal," and Chairman of the Great Barrier Reef Committee; and Mr. W. H. Rudd, Chairman of the Rockhampton Branch, a generous benefactor and staunch member for many years.

(*b*) The re-appointment of Major A. J. Boyd (Fellow) as Hon. Auditor, Mr. H. W. Mobsby (Fellow) as Hon. Lanternist, and Mr. Hugh Macintosh as Hon. Librarian.

To these officers the best thanks of the Council are also given for valuable services rendered.

In conclusion, the Council, on behalf of the Fellows and Members at large, desire to place upon record their high appreciation of the signal services rendered to the Society by His Excellency Sir Matthew Nathan during his term of office as President, and by whose constant and unflagging attention in that capacity the cause of Australian Geography has been stimulated and enriched to a far greater extent than heretofore; while his personal influence and active participation in the extension of the Provincial Branch work, the inauguration of the Great Barrier Reef Committee and the Joint Place Names Committee, have contributed largely to the establishment of a record in the history of organised effort in the field of Geographical research in this country. By his wide and varied experience; his general scientific and professional knowledge; his learned attainments, as student, administrator, writer, speaker, and original thinker; his eminent natural qualities of determination, tenacity of purpose and earnestness in what he considers to be a good cause, combined with promptness of action; have endeared him to all members and friends of the Society, while his tactful guidance in the administrative duties of the Council has contributed in no small measure to the success achieved. It is chiefly in view of these eminent services and as a mark of appreciation of his unvarying devotion to the interests of the Society in every way that the Council have unanimously decided to award Sir Matthew Nathan the "Thomson Foundation Gold Medal" of the Society, and confer upon him the Honorary Diploma of Fellowship.

STATEMENT OF ACCOUNTS.

From 1st July, 1924, to 30th June, 1925.

Dr.	£ s. d.	£ s. d.
By Balance in Commonwealth Savings Bank ..	..	133 14 8
„ Subscriptions Received	..	351 8 0
„ Interest on Savings Bank Deposit	..	4 17 11
		£490 0 7
Cr.		
To Gas	1 11 9	
„ General Printing	7 12 0	
„ Advertising and Expenses, Provincial Branches	48 16 2	
„ Cleaning	9 18 0	
„ Expenses of Meetings	6 1 0	
„ Post Cards for Meetings, &c. (including Branches)	18 12 0	
„ Typing and Clerical	15 3 0	
„ Half Cost of Printing "Journal," Volume XXXVIII. (Chief Secretary's Department bearing other half cost)	69 0 9	
„ General Postage	28 17 9	
„ Hon. Treasurer	100 0 0	
„ Hon. Secretary, Travelling in Provinces ..	50 0 0	
		347 8 8
„ Incidentals	12 14 3	
„ Exchanges and Petty Cash	3 2 10	
		15 17 1
		372 9 6
„ Balance	..	117 11 1
		£490 0 7

(*Note.*—The cost of printing Vol. XXXIX. is outstanding, the account not being to hand before 30th June, 1925.)

J. P. THOMSON, Hon. Secretary and Treasurer.

Examined with Vouchers, Bank Pass Book, &c., and found correct.

A. J. BOYD, Hon. Auditor.

July, 1925.

ROYAL GEOGRAPHICAL SOCIETY OF AUSTRALASIA (QUEENSLAND).

To His Excellency Sir MATTHEW NATHAN, P.C., G.C.M.G., LL.D., F.R.G.S., President.

SIR,—On the occasion of the Fortieth Anniversary of our Society, and on behalf of the Fellows and Members thereof, we desire to place upon record our deep sense of the great and important services rendered by Your Excellency to the cause of Geographical Science and in the development of our local work during the term of your office as President, for a period of five years. In expressing our feelings of deep regret at the heavy loss which we, in common with kindred bodies, will sustain by your all-too-early departure from Queensland, we wish to express our high appreciation of the ceaselessly active, prudent, and exemplary manner in which you have discharged the duties of office as our Leader, Counsellor, and Guide. We thank you for the great and stimulating personal influence you have exercised in the extension of our activities to the chief provincial centres of Queensland, reaching to the remote settlement at Thursday Island, and including the inauguration on your initiative of a representative committee for the scientific and economic investigations of the Great Barrier Reef of Australia, which we regard as an undertaking of vast national importance. From the time of your arrival in Brisbane as representative of His Majesty the King we have recognised your scholarly attainments, your wide and practical knowledge of geographical and kindred subjects, the unvarying tact that has characterised your relationship with all classes of the people, and we shall always regard your intimate association in the administrative work of our Society with deep affection, pleasure, and gratification.

In wishing Your Excellency long life and a happy termination of active service in the affairs of State and Empire, we feel that, as our esteemed representative, you will continue to advance the interests of the Royal Geographical Society of Australasia (Queensland), and you may rest assured that you will carry with you our affectionate remembrance and best wishes for your future welfare and happiness.

We are, Sir,

Very faithfully,

The Vice-Presidents,
the Hon. General Secretary and Treasurer,
and Councillors.

Brisbane, 31st August, 1925.

FORTY-FIRST ANNUAL GENERAL MEETING AND CONVERSAZIONE, 7th JULY, 1926.

His Excellency the Rt. Hon. Lord Stonehaven, G.C.M.G., D.S.O., F.R.G.S., Governor-General, in the chair

There was a large attendance, including Her Excellency Lady Stonehaven.

The minutes of the previous meeting of the Society were taken as read.

The Hon. General Secretary and Treasurer read an Address of Welcome to Lord Stonehaven (page 132). His Excellency, in response, gave an interesting Anniversary Address, in which he referred to his travels in Abyssinia and the Sudan (page 4).

The vote of thanks to the eminent speaker was moved by the Rev. Thos. Loose, seconded by Mr. A. Hertzberg, and carried by acclamation.

The Hon. General Secretary and Treasurer then read his Report and Financial Statement for the year 1925-26 (page 133). On the motion of the Rev. Thos. Loose these were adopted unanimously.

The Senior Vice-President (Hon. W. F. Taylor, M.D.) presented the Hon. Diploma of Fellowship to His Excellency Lord Stonehaven and the Diploma of Hon. Membership to Her Excellency Lady Stonehaven, in accordance with the decision of the Council, the action being approved by acclamation. The former recipient returned thanks.

The officers and Council were then elected for the Session 1926-27, as follows:—

Patron:

His Excellency Rt. Hon. Lord Stonehaven, G.C.M.G., D.S.O., F.R.G.S., Governor-General, &c.

Vice-Patron:

Rt. Hon. S. M. Bruce, D.C.L., LL.D., M.C., C. de G., Prime Minister.

Hon. President:

His Excellency the Governor of Queensland for the time being.

President:

His Grace Archbishop Duhig, D.D., F.R.G.S.A.

Vice-Presidents:

Hon. W. F. Taylor, M.D., F.R.G.S.A.

Sir Littleton Groom, K.C.M.G., M.P. Hon. A. J. Jones, M.L.A.

Hon. General Secretary and Treasurer:

J. P. Thomson, C.B.E., LL.D., Hon. F.R.S.G.S. (Edin.), &c.

Other Members of Council:

Chairman: Hon. W. F. Taylor, M.D.

B. Dunstan, Esq., F.R.G.S.A. F. J. Morgan, Esq.

A. Hertzberg, Esq. Professor H. C. Richards, D.Sc., F.R.G.S.A.

Rev. Thos. Loose. L. A. Wilkinson, Esq.

Capt. Arnold Wienholt, D.S.O., M.C., F.R.G.S.A.

This having concluded the business of the meeting, refreshments were served. Short musical selections were provided by Senor L. A. Pares, accompanied by Miss Anderson.

ROYAL GEOGRAPHICAL SOCIETY OF AUSTRALASIA (QUEENSLAND).

To His Excellency the Right Honourable LORD STONEHAVEN, G.C.M.C., D.S.O., F.R.G.S., &c., Honorary Fellow and Patron.

Brisbane, 7th July, 1926.

SIR,—On behalf of the Executive, the Council, Fellows, and Members of the Royal Geographical Society of Australasia (Queensland), I regard it as an exceptional honour to have conceded to me the privilege of offering to Your Excellency and Lady Stonehaven a cordial welcome to their Forty-first Anniversary Meeting.

Since your arrival on the shores of Australia, as the worthy Representative of His Majesty the King, we have looked forward with much interest to your probable visit to Queensland and active participation in the national work of this Society, with which your eminent predecessors were so closely identified.

My Colleagues of the Council rejoice in the selection of one of the Senior Fellows of the famous Royal Geographical Society, London, to preside over the destinies of the Great Commonwealth of Australia, of which our distinguished Vice-Patron is the Prime Minister. We are particularly pleased at the presence of Your Excellency and Lady Stonehaven on this occasion, not only as affording our esteemed supporters the privilege of cordially welcoming you, but also of enabling them to realise that the promotion of geographical knowledge is of vital importance and essential to the welfare of the educational and general intellectual life of the people, and therefore worthy of recognition and support.

From the earliest times the history of Australia is punctuated by the thrilling narratives of glorious achievements in the field of exploration and discovery, in which our grand old Parent Society has borne an honourable share, so we are glad to recognise in Your Excellency an enlightened supporter of that renowned body and greet you most cordially as a fellow-worker and distinguished co-operator.

The office of Patron of our Society since its inception has been filled by eminent men at the head of both the Commonwealth and the State, including Sir Henry Wylie Norman (afterwards Field Marshal), Viscount Novar (now President of our sister society in Edinburgh), and Lord Forster (your predecessor as Governor-General), all of whom have personally identified themselves with our activities to the manifest advantage of the Society and the furtherance of Geographical Science.

In wishing you and Her Excellency Lady Stonehaven a pleasant sojourn in the State, I trust you both will retain many happy recollections of the glorious scenery and climate of North Queensland, as well as of the hospitality of the people at large, and return shortly feeling convinced that the winter climatic conditions of life in this country are ideal and unrivalled elsewhere in the whole world.

Signed on behalf of the Royal Geographical Society of Australasia (Queensland).

J. P. THOMSON, Hon. General Secretary and Treasurer.

Royal Geographical Society of Australasia (Queensland).

ANNUAL REPORT, 1925-26.

On behalf of the Council I have the honour of reporting to the Fellows and Members on the activities of the Royal Geographical Society of Australasia (Queensland), during the Forty-first Session, brought to a close on the 30th June.

It is gratifying to note that the increase of membership to which allusion was made at last Annual Meeting has been correspondingly sustained during the period under review, the full roll now showing a total of between 600 and 700 members, considerably larger than any other permanent scientific body in the Commonwealth. Still it is contended that this number should be greatly multiplied and every effort to that end will, it is hoped, be made both in Queensland and by extending the influence of the Society to New South Wales and Victoria, as formerly, there being little doubt that the thickly populated commercial and industrial centres in Sydney and Melbourne offer a wide field for the extension and development of the Society's work. Even in the Federal capital at Canberra early provision should be made for the establishment of a great central bureau for the acquisition and dissemination of Geographical Knowledge concerning Australia, New Guinea, and the Pacific Islands, and more particularly with the view of acquiring material for a relief or contour map of the Continent (the need of such being only too obvious). And this is not a matter concerning one State more than another, for in the pursuit of Geographical or other Scientific Knowledge there can be no recognition or limitation of territorial boundaries, the field of research and investigation being universal and open to all willing to contribute to the common store of knowledge. That the want of a map showing the features of the country is a very serious drawback can hardly be doubted, even from an educational standpoint alone, while for military and commercial transport purposes the position is even worse. No satisfactory system of public highways can possibly be developed without an accurate knowledge of the physical condition of the territory traversed, and this Society fully realised it when some years ago its Foundation Gold Medal was offered for the best essay on the relief of the western half of the Australian Continent, but without result. In his last address delivered to the Society before leaving Queensland, Sir Matthew Nathan made special allusion to the subject, deploring the fact that nothing had been done in the matter.

With the exception of the Gympie, Townsville, and Cairns branches, the provincial movement has been fairly active during the session now brought to a close. After leaving Brisbane for England, *viâ* the northern coastal towns

of the State and the Far East, Sir Matthew Nathan gave a farewell address to our Branches at Bundaberg, Mackay, and last of all, Thursday Island, all being largely attended, his final farewell message being communicated to me by telegram on boarding the eastern steamer "Tanda," and which reads as follows:—

> "Good-bye to the Society with which I have been so closely connected, and to the secretary that has served it so well.
>
> "Nathan."

Before leaving for America, the Acting President (Archbishop Duhig) accompanied me to Bundaberg, Maryborough, Ipswich, Toowoomba, and Warwick, where His Grace gave his popular lantern lecture on Papua before the local branches, the Town Hall at each centre being crowded by appreciative audiences, including the local authorities and other leading citizens, great interest being everywhere shown in the Society's activities. Arrangements had been made for Dr. Duhig to repeat his lecture at Rockhampton and Mackay, but at the last moment he was obliged to postpone his visit there until his return from abroad. Fortunately the disappointment felt locally at the change of programme quickly disappeared when it became known that the Branches would be given a popular lantern lecture on a "Lion Hunting Expedition in Central Africa," by Captain Arnold Wienholt, the well-known big game hunter, who accompanied me to Rockhampton and Mackay last May. The lecture at both centres was highly successful, being only equalled by a former occasion, when Sir Matthew Nathan journeyed with me to Mackay to inaugurate the Branch there some years ago. I had made arrangements to visit the Branches at Townsville and Cairns during the month of June to organise the movement there and arrange a working programme with the local executive, but found it necessary to wait until after this Meeting, when I must start for those far northern centres, as further delay would greatly prejudice our provincial work and break confidence with our local supporters. When Sir Matthew Nathan was here our Branch activities were greatly stimulated by his personal help, for besides travelling with me to the rural centres, both north and south, during his term of office as Governor of Queensland, he frequently took the initiative in our work both in the country and at headquarters, and that was a great help to me in organising the lectures and public meetings, as well as in carrying on the duties of my office. It must be realised that for quite a long time to come the provincial work will need to be helped and stimulated by close and personal attention on the part of the Chief Executive Officer from the Society's Headquarters. It simply means pioneering effort all along, effort that must not be relaxed in the slightest degree if the movement is to succeed and justify itself.

The addresses given at Headquarters of the Society in Brisbane during the Session were of much public interest and importance, and included:—

(i.) "The Heart of the Great Sudan," by the Reverend D. N. MacDiarmid, B.A.

(ii.) "A Recent Visit to the Islands of Torres Strait," by Major-General J. H. Bruche, C.B., C.M.G.

(iii.) "My Visit to Papua," by His Grace Archbishop Duhig, D.D., F.R.G.S.A.

(iv.) "A Lion Hunting Expedition in Central Africa," by Captain Arnold Wienholt, D.S.O., M.C.

To the authors of these addresses the best thanks of the Society are due.

Among the gifts of various kinds that have come to the Society from time to time, mention must be made to a very valuable collection of ancient coins donated by Mr. L. H. Maynard, Chairman of our Bundaberg Branch. At present the collection is deposited in the strong room of the National Bank of Australasia in charge of our Councillor, Mr. F. J. Morgan, for safe-keeping, until we can find some generous friend to donate a cabinet or showcase so as to have the coins on exhibition at our rooms. Allusion must also be made to a very valuable original map, with associated photographic enlargements, of important oil-bearing country in the north-eastern portion of the mandated territory of New Guinea, the gift of the author, Mr. W. A. Chadwick, who surveyed and mapped out the area. Acknowledgment is also due to Dr. G. H. Vernon, M.C., the enthusiastic and efficient Hon. Secretary of our Thursday Island Branch, for a most interesting set of lantern slides with skeleton lecture, depicting Borneo, Siam, Singapore, Sumatra, Java, Temati, Celebes, Bali, and Lombok, prepared by himself from notes and photographs obtained during a six-months' tour in the Malay Archipelago. These have been placed at the disposal of the Society for the use of the Branches and at Headquarters.

The Council notes with much pleasure that the investigations of the Great Barrier Reef Committee, inaugurated by this Society some time ago, are being continued under the direction of Professor H. C. Richards and Mr. Charles Hedley, a recent report by the former indicating that the boring on Michaelmas Reef, at Oyster Cay, near Cairns, is now well under way. In the beginning of the Session a joint Committee was formed, representing this Society and the Historical Society, to raise a monument at the place where Captain Cook first landed on the shores of Bustard Bay. Sufficient funds for the purpose having been collected, the monument was duly erected on the site selected, and according to Press reports the ceremony of unveiling it took place recently under favourable auspices, H.M.A. Naval officers operating in the locality being the chief participants.

As mentioned in the concluding sentence of my last Annual Report, the Council unanimously decided that the Thomson Foundation Gold Medal of the Society should be awarded to Sir Matthew Nathan "in view of his eminent services and as a mark of appreciation of his unvarying devotion to the interests of the Society in every way," the presentation of the medal being made to Sir Matthew on the occasion of his last appearance in this hall at our fortieth Anniversary Celebration, at the end of August last year, when he was ready to finally leave Brisbane. As this was the last medal in stock I have placed an order with the Royal Mint, Sydney, for a fresh supply before that establishment finally closes down. The Superintendent of the Mint has kindly agreed to keep possession of the medal dies until we make arrangements to transfer them to Melbourne. This is an advantage, as the dies were very costly, and great care for their preservation was needed when transferring them from London to this country some years ago at the instigation of Sir Hamilton Goold-Adams, when President of the Society.

The library of the Society continues to grow rapidly, every overseas mail bringing valuable additions of exchange publications from all parts of the world in return for our "Journal," a foreign edition of which is sent out, every issue, to scientific bodies, public institutions, libraries, and Government departments everywhere. At the present rate of increase it is difficult to

imagine what the extent of our library will be even in the next decade, and it will be still more puzzling to provide adequate accommodation for such valuable accumulations of the world's scientific literature.

The annexed Balance-sheet, duly audited, shows a credit balance of the current account in the Commonwealth Bank of £120 5s. 4d. The newly instituted Endowment Fund stands at £68 2s. 7d., the latest donation thereto of £25 being from Mr. A. J. Raymond, an old and greatly esteemed member of many years' standing, who, in forwarding his cheque a few days ago, said:—"My dear Thomson,—Appreciating very highly your efforts for the welfare of the Society, I have much pleasure in sending you a cheque for £25 towards the Endowment Fund." The previous contributors to the Fund were Sir Matthew Nathan, Archbishop Duhig (on whose suggestion it was started), Messrs. E. E. Edwards and S. Hannaford (Stanthorpe). Who will be the next, I wonder?

The interest accruing from the Thomson Foundation Gold Medal Endowment Fund, on the 30th June, 1926, amounts to £48 19s. 9d.

Even those familiar with the extensive routine work of a Society like this can hardly realise or understand the expense involved during the course of a year's operations. Yet a general review of the financial position of the world's kindred institutions will clearly enough show that in comparison our Society stands alone for economy in expenditure, as it also does in carrying on its functions by voluntary effort. So long as the eleven Provincial branches (and in this respect, too, the Society stands alone, as in no other country is there such extended ramification) are functioning and kept active, as at present, there must always be current working expense in addition to the expenditure at Headquarters in Brisbane. Even in the case of my own personal travelling expenses for the last five years or so, only a small portion of the actual cost has appeared in the books of the Society, the balance being considered a private personal matter; otherwise the work could not have been done, and the Society's publications would have been curtailed. This would have been suicidal and against the best interest of the movement.

In accordance with the terms of Section IV., Clause 3, of the "Constitution and Rules," my Council has unanimously decided to confer the Diploma of Honorary Fellowship on His Excellency the Right Honourable Lord Stonehaven, G.C.M.G., D.S.O., Governor-General and Patron Designate.

Not only has His Excellency rendered a very real service to the Society at large by his presence here on this occasion, in the absence of the President, but his personal and active participation in our proceedings, as an honoured Fellow of the Parent Society, at this Meeting cannot fail to greatly stimulate our work and thereby contribute to the general advancement of Geographical Science in Australasia.

By the "Rule" governing the Fellowship Award, the number of Honorary Fellows is limited to ten, and includes H.R.H. the Prince of Wales, who honoured the Society by accepting the Diploma, on the occasion of his visit to this country in 1920. For reasons, although not exactly similar in every detail, nevertheless equally important, the Council deem it a very great privilege to have the honour of nominating Her Excellency Lady Stonehaven as an Honorary Member of the Society, and in doing so they feel sure that her

presence at our Forty-first Anniversary Meeting will not only encourage our lady supporters to further effort in the advancement of our cause, but can hardly fail to suggest to other lady friends that membership of the Society is a legitimate and praiseworthy means of contributing to the promotion of Geographical Knowledge and furthering the interests of the educational and general intellectual life of the Commonwealth at large.

In conclusion my Council recommend:—

(*a*) That in accordance with notice of motion at last Anniversary Meeting provision be made for an Honorary President of the Society (as in the case of the Parent body).

(*b*) That the Chairmen and Secretaries of all the Provincial Branches be *ex-officio* members of the Council of the Society.

(*c*) That Mr. A. S. Kennedy, Fellow and former Hon. Librarian, be Hon. Auditor of the Society.

(*d*) The reappointment of Mr. H. W. Mobsby (Fellow) as Hon. Lanternist, and Mr. Hugh Macintosh as Hon. Librarian.

To the retiring Hon. Auditor (Major Boyd), an old and much valued officer, to the Hon. Lanternist and the Hon. Librarian, the cordial thanks of the Society are due and hereby recorded.

The Council also desires to thank the Queensland Government for much valued support from time to time.

STATEMENT OF ACCOUNTS.

From 1st July, 1925, to 30th June, 1926.

Dr.	£ s. d.	£ s. d.
By Balance in Commonwealth Bank	..	117 11 1
„ Subscriptions Received	..	403 10 0
„ Donation by Councillors to Refreshment Fund..	..	7 7 0
„ Interest on Savings Bank Account	..	4 13 11
„ Contribution to Capital Fund	..	68 2 7
		£533 2 0
Cr.		
To General Printing	22 4 6	
„ Advertising and Branch Expenses	20 11 3	
„ Expenses Meetings, Headquarters	13 13 11	
„ Post Cards for Meetings and Lectures (including Branches)	31 8 10	
„ Typing and Clerical	22 5 4	
„ Half Cost of Printing "Journal," Vol. XXXIX. (Chief Secretary's Department bearing other half cost)	59 18 9	
„ General Postage, including Branches	35 8 11	
„ Telephone Charges and Incidentals	14 14 6	
„ Travelling Expenses on Branch Business ..	22 11 6	
„ Hon. Treasurer	100 0 0	
„ Hon. Secretary (Travelling in Provinces) ..	50 0 0	
„ Stationery	17 7 9	
		410 5 3
„ Exchange on Cheques	..	2 11 5
		412 16 8
„ Balance in Savings Bank	..	120 5 4
		£533 2 0

J. P. THOMSON,
Hon. Secretary and Treasurer.

Examined with Vouchers, Bank Pass Book, &c., and found correct.

A. J. BOYD, Hon. Auditor.

1st July, 1926.

Royal Geographical Society of Australasia (Queensland).

Report by the Hon. General Secretary and Treasurer on his Visit to the Cairns and Townsville Branches of the Society, July, 1926.

(Report received and adopted by Council on motion of Mr. Hertzberg, seconded by Rev. Thos. Loose.)

I have the honour of reporting, for the information of the Council, as follows:—On the second day after the Anniversary Meeting of the Society, held on Wednesday, the 7th July, I left Brisbane for North Queensland to continue the Provincial Branch work started by me a month earlier last year. The train journey was broken at Townsville for the purpose of making preliminary arrangements with the local Hon. Secretary as to the inauguration of the Branch and subsequent action. On arrival at Cairns it was very gratifying to find that the Branch had made fairly satisfactory headway during the financial year, the first lecture being given to the local members by Sir Matthew Nathan in passing through Cairns on his way to the far East, when returning to England, last October. In response to the special request of the local Executive, I had the honour of delivering a popular lantern lecture on "Life in the Pacific Islands," to a very large audience of members of the Society and the public in the big Hibernian Hall, at which His Lordship the Bishop of North Queensland presided. The lecture was featured in the following day's issue of the "Cairns Post," and had the distinction of being backed up by a very able leading article, both of which are herewith tendered for the information of members of the Council (page 141). It was generally considered that the lecture would do much good in stimulating public interest generally in the work of the Society. His Excellency the Governor-General, who arrived in Cairns on the evening of the lecture, was good enough to write to the local secretary, Mr. Lionel Draper, regretting very much that he was not able to be present.

At the Town Hall, Townsville, the lecture was repeated to a large and appreciative audience, the chair being taken by one of the senior Aldermen, in the absence in Brisbane of the local Branch Chairman, Judge Douglas. It was gratifying to notice that the lecture attracted many of the Grammar School students, who were noticed among those in the main body of the hall, and who seemed much interested in the subject. From the reception accorded the lecture at both centres it was clear that the public interest in the activities of the Society is spreading and not merely confined to an exclusive class or to local subscribers, and moreover, shows that every effort to provide the people with scientific or geographical knowledge in popular and attractive form is appreciated and supported. As to future prospects, although encouraging, it must be said that the position of the Townsville Branch seems less promising than that at Cairns, chiefly, if not wholly, due to lack of initiative. And indeed the same may be said of some of the other branches. Until local

branch Executives realise that self-help is essential to the success and development of the movement there can be no real or permanent progress. A striking example of this is furnished by the Torres Strait Branch, where meetings are held monthly, and excellent lectures given, some of sufficient interest to ensure their publication in next issue of our "Journal." And all this Branch's activities have originated locally from the start, without any assistance from Headquarters. Occasional lectures from outside sources are, no doubt, desirable at provincial centres, but the main effort in branch work should come from within. For not only will this keep the members together, but it will bring out and encourage local talent, thereby utilising material that would otherwise be lost and that might be of benefit to the community. The chief problem of the Provincial Movement is the selection of a local secretary. And it must be confessed that this is the greatest difficulty of all, and one almost insurmountable in some cases. Men of unquestionable ability and high social standing are not scarce, but those possessing enthusiasm and capacity are as rare as the famous Gates of Thebes, or "Nile's disparting stream." Even at Headquarters past experience has abundantly shown on many occasions that voluntary helpers merely assumed interest in the work while the novelty lasted, and shortly disappeared—a mere "flash in the pan." This, indeed, was the main cause of the complete extinction of the Sydney and Melbourne Branches of the Society years ago, and of several local bodies in my experience.

When in Cairns the opportunity was taken, on the special invitation of the Scientific Director, to visit and view the boring camp at Oyster Cay, Michaelmas Reef, about 22 miles in a N.N.E. direction from the town, and near the outer edge of the Great Barrier Reef. Here the drill had reached a depth of 480 feet, but only a very thin veneer of solid coral had been met with, indicating, as indeed anyone familiar with Pacific Island reefs had anticipated, that the vast coral structure buttressing the North-Eastern Coast of Queensland is of comparatively recent geological age, and accounts for the absence of its continuity, the reef occurring in isolated patches from south to north along its entire length. The boring operations have been instituted and conducted under the personal direction of Mr. Charles Hedley, whose experience of the work and of coral reefs is, perhaps, unique. The initial difficulties have been considerable, including transportation and erection of boring plant and hut, as well as water storage for domestic consumption, provisions, &c.

J. P. THOMSON.

23rd August, 1926.

GEOGRAPHY—IMPERIAL AND LOCAL.

(Reprinted from the "Cairns Post" Leading Article, 20th July, 1926.)

It has very truly been stated that a knowledge of Imperial geography is not an "accomplishment." It is an essential, not only for the inhabitant of Great Britain, but for all the vast multitude who are British in the larger sense. If it were possible to make the growth of a wider and better knowledge of Imperial geography the vital factor in the education of every citizen of the Empire, a splendid service would be done to the peoples of our own magnificent birthright. Much, however, has been done, by lectures and by literature, to broaden and deepen the knowledge of Imperial geography. We see something of that aspect of the case in Australia. Lectures, such as that given last night in the Hibernian Hall by Dr. J. P. Thomson, C.B.E., bring before the public with great force not only the splendid national work being carried on by the Royal Geographical Society of Australasia (of which he is the founder) in the principal provincial towns of Queensland, as well as in Brisbane. These lectures go much farther than that. They have a stimulating influence on the educational and intellectual life of the people at large, and help them to realise to some degree Australia's responsibility to the Empire, in the protection of the native inhabitants of the mandated territories of the Pacific.

At the end of the Great War the former German possessions in New Guinea, New Britain, the Solomons, and adjacent islands were placed under Australian control. These islands included the rich phosphatic deposits on Ocean Island and elsewhere. Not only do these highly important territories possess inexhaustible natural wealth, but their immense resources are wholly undeveloped, and invite foreign exploitation should any laxity or indifference be shown in their protection by the Commonwealth authorities. Few people realise that the Pacific Ocean covers half the water surface of the globe and more than one-third of its whole area (70,000,000 square miles). Its depths are profound. If Mount Everest, the highest mass on the earth's surface, were placed in the "Tuscarora" Deep, near the Philippines, its summit would be covered by several hundreds of feet. Over this vast expanse of ocean are scattered numerous inhabited islands and groups of islands stretching thousands of miles from east to west and north to south, forming an extensive Pacific empire in themselves, and inhabited by two distinct divisions of the human family, ethnologically known as Polynesians and Melanesians.

In point of distance New Guinea and the adjacent islands are the nearest to this country, and their strategical importance can hardly be over-estimated. No doubt this was foreseen by that fine Queensland statesman, Sir Thomas McIlwraith, when taking the bold step to annex the Papuan territory as part of the British Empire in "the eighties." At that time it was well known in fully informed circles that the German Pacific Islands colonising and developing policy was based entirely on a combination of Science and Politics. Germany was continually looking for new places to occupy. That she did so to good purpose was made only too clear in the annexation of Kaiser Wilhelm's Land, the Bismarck Archipelago, and New Pomerania, as well as Samoa, the Carolines, and other important islands in the Pacific. Although these important territories are no longer under foreign control, it must be remembered that the Caroline groups are now held under Japanese mandate, and as such must

always be regarded as different from our own country in life, ideals, institutions, and government. Lying adjacent to the shores of Australia, and within a few days' sail or hours' flight of Northern Queensland ports, those islands are easily accessible, and in times of disturbance or great national stress would have an important bearing on the future of this country, either for good or evil, as the case might be.

The waters of the Pacific Ocean afford unlimited scope for great naval demonstrations, and the islands have many advantages for the establishment of strong naval bases. But these conditions are not realised by those unfamiliar with the local position; and so it comes about that the people of this country, instead of pulling together in the interests of all classes, are content to live in blissful ignorance of outside dangers that may at any time menace the security of the Homeland, and, therefore, of the whole Empire. The Prime Minister of the Commonwealth, quite recently, made some pregnant and forceful remarks in regard to Australia and its obligations. "The Public Conscience of Nations will not allow this great Continent to remain in the hands of a few millions of people, when its resources, if undeveloped, would probably solve most of the economic problems that face the world to-day. If the prospects of future peace become assured under the rule of international law, we in Australia will inevitably be called to the bar of the world's opinion, and be asked what we are doing with this great continent," said Mr. Bruce. Other nations, because their populations are increasing beyond the ability of their economic resources to maintain them, are looking for outlets for their surplus people. During the past twenty years China has increased her population by 41,000,000 of people; Japan by 13,000,000. There is tremendous significance in these facts. And it is necessary, in a complete study of the problems involved, to have a very clear knowledge of our geographical position to these centres of teeming population. The case is important from every aspect. The islands and continents contiguous to our shores are, as at present, danger zones to Australia. We dare not overlook this irrefutable fact. This is what a study of geography teaches. The work which the Royal Geographical Society is doing through the mouth of its highly competent lecturers is many-sided. Its best achievement is that it is improving the knowledge of the people in those subjects that are of the most vital import to them. Queensland is especially concerned, as the informed well know. And for this reason we dare not remain in ignorance of our position. To do so would be to hide our heads in the sand of callous indifference or criminal neglect.

NATIVE CUSTOMS IN THE PACIFIC ISLES.

ILLUMINATING LANTERN LECTURE.

(Reprinted from the "Cairns Post," 20th July, 1926.)

In the Hibernian Hall, last night, Dr. J. P. Thomson, C.B.E., delivered a lecture on the manners and social customs of the natives of the Pacific Islands. Incidentally, the lecturer touched the economic and political significance of the islands adjacent to Australia.

The chairman was His Lordship the Bishop of North Queensland, and the lecture was delivered under the auspices of the Royal Geographical Society of Australasia (Cairns Branch).

There was a large attendance.

Australia's Neighbours.

Dr. Thomson prefaced his lecture with a résumé of his own official duties in the Pacific Islands. By his examination of the islands, and of their inhabitants, he had become acquainted thoroughly with their characteristics, ideals, and mannerisms. He had learned their language so well that he had developed a great enthusiasm for it. To such an extent was this manifested that, on his return to Sydney and Melbourne, he found himself unconsciously employing native words in ordinary conversation. He experienced a feeling of sadness sometimes when he remembered his association with Sir William MacGregor, Sir George Le Hunte, and others. They were mostly of very fine physique, yet they were all gone. Their work in the Pacific was ceaseless and valuable.

The lecturer also took his audience over the whole of the Pacific Groups by means of a large map, for the loan of which he expressed his gratitude to the headmaster of the Cairns High School.

Describing the two ethnological groups in the Pacific—Polynesian and Melanesian—Dr. Thomson said that though Melanesian came from the Greek Mela (black), the natives were not really black, but of a bright copper colour. The moral code and social systems were admirable, and were lax only when they came into contact with the white man. Cannibalism existed in a certain few isolated cases, but the social life generally was of a high order.

The lecturer then proceeded to illustrate his remarks by about ninety beautiful slides.

"Mystery" Island.

Depicting the "mystery" island of the Pacific, the lecturer said that the ancient people had a habit of deforming the ear lobes; and a number of slides showed the giant statues in which was perpetuated the native customs in this regard. An interesting diagram of a sea wall on Easter Island was shown. How the statues came there was a mystery. No one knew the fates of the

natives, the quarry from which the statue stone was gained, and the motive of the sculpture was all unknown.

A graphic picture of native women wearing typical ornaments formed of hibiscus flowers was very interesting.

Japan's March Southward.

A group of Caroline Island native dancers instanced the fact that the Japanese were making good use of their opportunity of educating the native. This was followed by a picture of a native fleet of canoes, and the lecturer was concise in his description of the nautical methods of the Caroline seamen. The women did all the fishing and the work, and went far out on the reef to get their own fish. An artistic representation of a village scene in the Carolines was loudly applauded, and some club houses in Yap appeared to have been well built and cool. The ancient inhabitants of the Caroline group must have been a vastly different people to the present occupiers of the group. The present-day native had none of the ideas crystalised in the splendid relics of masonry and buildings found in the islands. Some of the early burial places had been made of sheets of lava, and the lecturer had once advanced the theory that the group had been inhabited by a branch of the Phœnician race.

The Japanese were an enlightened and progressive people, and there was regular communication between Japan and the islands. The school children of the Mariana Islands knew writing and arithmetic, and were entirely different to conception of the "savages" that was generally held. Some native villages in this group were methodically laid out, and the houses of the chiefs were excellently carved out and ornamented.

Construction.

A club house in the Palao Islands, and a typical native house, showed much comfort and foresight in their construction. In the Mariana Islands, which had come more into contact with the Japanese, the native went in for more hospital and social work, and a group presented showed a greater regard for clothing than was general. Another group of native children caused surprise by their fine physical structure and appearance of mental endowments. Two well-developed boys wore the native armlets and ornaments, which formed a pretty effect.

Romantic Features.

In the Solomons the faces of three boys showed much intelligence and cultural possibility out of all comparison with the general conception of life in the Pacific Isles. A beautiful scene of the Solomons was followed by a canoe scene of surpassing beauty. The New Britain natives were musical and fond of dancing. Sometimes they made their musical instruments from reeds of varying lengths.

A young native chief was remarkable for his wonderful head-dress, and a number of photos. of women wearing their native ornaments of coral showed them as particularly well developed and pretty.

R.L.S. Memory.

Another photo. was particularly interesting. It was of the native companion of Robert Louis Stevenson, who lived and died at Samoa. This was followed by a photo. of "R.L.S's." grave, on which was the epitaph written by himself.

British Pluck.

A number of slides were reminiscent of the famous "Calliope" incident, and the lecturer raised a loud cheer by his recital of the "Calliope's" dash for the open sea, commanded by Captain Kane.

Christianity.

A number of Tongan chiefs were shown, and one ancient old warrior was the most notable cannibal of Fiji until his conversion to Christianity. The lecturer had often lived in the Fijian houses, and had found them particularly comfortable.

The coral reefs were different to the coral of the Barrier Reef, where it was in more isolated patches. One of the finest slides was that of a coral reef in the South Pacific. The scenery and people of Nauru were also of a fine type, as presented by Dr. Thomson. Especially were the landscapes of all the islands of fine class, and depicted the clearly entrancing beauty of the tropic isles.

The lecturer was accorded a hearty vote of thanks, on the proposition of His Lordship, and in reply Dr. Thomson proposed one to the operator (Mr. Moynahan).

Mr. Lionel Draper proposed a vote of thanks to His Lordship for presiding.

PROVINCIAL BRANCHES.

Bundaberg Branch.—Chairman: Mr. L. H. Maynard; Hon. Sec.: Mr. W. Peters.

Cairns Branch.—Chairman: Dr. P. S. Clarke: Hon. Sec.: Mr. Lionel Draper.

Gympie Branch.—Chairman: F. B. Sykes; Hon. Sec: Mr. D. A. Brien.

Ipswich Branch.—Chairman: Mr. R. A. Kerr, M.A., B.Sc.; Hon. Sec.: Miss A. Douglas Brown.

Mackay Branch.—Chairman: Mr. W. A. Amiet, M.A.; Hon. Sec.: Mr. Ian Wood.

Maryborough Branch.—Chairman: Hon. A. Dunn; Hon. Sec.:

Rockhampton Branch.—Chairman: Mr. W. H Rudd (Fellow); Hon. Sec.: H. A. Kellow, M.A.

Toowoomba Branch.—Chairman: Dr. T. A. Price; Hon. Sec.: Mr. C. G. Warrian, J.P.

Thursday Island and Torres Strait Branch.—Chairman: Mr. A. Broadbent; Hon. Sec.: Dr. G. H. Vernon, M.C.

Townsville Branch.—Chairman: His Honour Judge Douglas; Hon. Sec.: Mr. P. F. Rowland, M.A.

Warwick Branch.—Chairman: Mr. J. J. Kidner; Hon. Sec.: Mr. R. D. Hunter.

THE THOMSON FOUNDATION GOLD MEDAL.

Awards.

The Thomson Foundation Gold Medal of the Royal Geographical Society of Australasia (Queensland), established in 1900 in honour of Dr. J. P. Thomson, the Founder of the Society, shall be awarded annually, or at such other times as the Council may approve, to the author of the best original contribution to Geographical Literature, provided it be of sufficient merit, approved and accepted by the Council. Special awards of the Medal may also be made from time to time to such persons as have gratuitously rendered eminent services to the Society.

The following are the names of the recipients of the Medal, the grounds of the award being noted only briefly here, but are given more fully in the "Journal," to which reference is hereafter made:—

1901—**Dr. J. P. Thomson,** for his great services to Geographical Science. *Vide* "Queensland Geographical Journal," vol. xv., pp. 133-134; vol. xvi., pp. 132-135, 141-142.

1906—**Sir Hugh M. Nelson,** for his valuable services to the Society. *Vide* "Queensland Geographical Journal," vol. xxi., p. 151.

1910—**Sir Arthur Morgan,** for valuable services rendered to the Society. *Vide* "Queensland Geographical Journal," vol. xxv., p. 144.

1917—**Dr. T. Griffith Taylor,** for "Thesis on the Settlement of Tropical Australia." *Vide* "Queensland Geographical Journal," vol. xxxii.-xxxiii., p. 1.

1920—**Major Sir Hamilton J. Goold-Adams,** for valuable services to the Society as President. *Vide* "Queensland Geographical Journal", vol. xxxiv.-xxxv., p. 69.

1921—**Hon. W. F. Taylor, M.D.,** for valuable services to the Society. *Vide* "Queensland Geographical Journal," vol. xxxvi.-xxxvii., p. 99.

1925—**Sir Matthew Nathan,** for signal services rendered to the Society during his term of office as President, 1920-26. *Vide* "Queensland Geographical Journal," vol. xl.-xli., p. 128.

DIPLOMAS OF FELLOWSHIP.

The following gentlemen have been awarded the Diploma of Fellowship under Section IV. of Clause 3, Constitution and Rules (*see page 2 of cover*):—

H.R.H. the Prince of Wales, K.G., &c.

*Major Sir Hamilton J. Goold-Adams, G.C.M.G., C.B., F.R.G.S.

Professor J. W. Gregory, D.Sc., F.R.S., Geological Department, University, Glasgow, Scotland.

*The Right Hon. Sir S. W. Griffith, G.C.M.G., M.A., &c.

Clifford H. Hay, Esq., C.M.G., M.V.O., Secretary, Premier's Department, Sydney, N.S.W.

The Right Hon. Lord Lamington, G.C.M.G., G.C.I.E., B.A., F.R.G.S., Hon. F.R.S.G.S., &c.

*The Right Hon. Sir William MacGregor, G.C.M.G., C.B., M.D., LL.D., D.Sc., Hon. F.R.S.G.S., &c.

The Right Hon. Viscount Novar of Raith, G.C.M.G., LL.D.

His Excellency the Rt. Hon. Lord Stonehaven, G.C.M.G., D.S.O., F.R.G.S., Governor-General and Patron.

*J R. Atkinson, Esq., L.S., J.P.
E. C. Barton, Esq., C.E.
*Charles Battersby, Esq., J.P.
*Harry Baynes, Esq., J.P.
Major A. J. Boyd
*Hon. F. T. Brentnall
*John Cameron, Esq., J.P.
J. C. Cartledge, Esq.
*R. M. Collins, Esq., J.P.
Alexr. Corrie, Esq., J.P.
*Ald. John Crase, J.P.
His Grace Archbishop Duhig, D.D.
B. Dunstan, Esq.
E. E. Edwards, Esq., B.A.
J. T. Embley, Esq., L.S.
F. B. C. Ford, Esq., J.P.
*Robert Fraser, Esq., J.P.
L. C. Horton, Esq., J.P.
A. S. Kennedy, Esq.
*W. A. Dudley Le Souëf, Esq., C.M.Z.S., &c.
C. B. Lethem, Esq., C.E.
W. M. L'Estrange, Esq.
Hon. C. F. Marks, M.D.
R. H. Matthews, Esq., L.S., J.P., &c.
Thos. J. McMahon, Esq.
Rev. E. N. Merrington, M.A., Ph.D.
H. W. Mobsby, Esq., F.R.S.A.
*Hon. Sir Arthur Morgan, Kt., F.R.G.S., &c.
*Alexander Muir, Esq., J.P.
His Excellency Hon. Sir J. H. P. Murray, K.C.M.G.
*George Phillips, Esq., C.E.
Professor H. C. Richards, D.Sc.
W. H. Rudd, J.P.
L. F. Schoenheimer, Esq., J.P.
A. A. Spowers, Esq., J.P., &c.
*James Stodart, Esq., M.L.A.
*T. S. Sword, Esq., J.P.
Hon. W. F. Taylor, M.D.
Capt. W. C. Thomson
A. D. Walsh, Esq., J.P.
*E. M. Waraker, Esq., J.P.
Capt. Arnold Wienholt, D.S.O., M.C.
J. P. Wilson, Esq.
W. A. Wilson, Esq.
Rev. L. L. Wirt, B.D.

* Dead.

LIST OF MEMBERS.

(P) Members who have contributed papers which are published in the Society's "Journal." The numerals indicate the number of such contributions.

(PP) Past President.

A dagger (†) prefixed to a name indicates a member of the Council.

Life members are distinguished thus (*).

Should any error or omission be found in this list, it is requested that notice thereof be given to the Hon. Secretary.

Foundation Members.

P1 Allardyce, His Excellency Sir Wm. L., K.C.M.G., Govt. House, St. Johns, Newfoundland.
d Alton, R., Brisbane.
d Armour, R. L., J.P., Brisbane.
d P1 Atkinson, J. R., L.S., Ipswich.

d Bailey, T. S., Survey Department, Brisbane.
d P1 Bartley, N., Brisbane.
d Bell, W., Supreme Court, Brisbane.
d P1 Bennett, E. J., Survey Department, Brisbane.
d Brydon, J. M., J.P., Brisbane.

d Coghlan, J., Mount Eagle, Cooyar.

d Daniell, E. N., Survey Department, Brisbane.
d Davidson, W. M., Deputy Surveyor-General, Brisbane.
d Drury, E. R., C.M.G., General Manager, Q.N. Bank, Brisbane.

d Ferguson, J., J.P., Brisbane.
d Foxton, Hon. J. F. G., Brisbane.
Fraser, T., L.S., Brisbane.

d Gailey, R., J.P., Brisbane.
d P9 PP Gregory, Hon. Sir A. C., K.C.M.G., M.L.C., F.R.G.S., &c., Brisbane.

d Heath, G. P., J.P., Comm. R.N., Brisbane.
d Heeney, F. X., J.P., Lands Department, Brisbane.
P1 Hennessy, Capt. J. M., New Guinea.
Hoggan, R., B.A., Survey Department, Brisbane.
d P1 Hull, A. A., L.S., Survey Department, Brisbane.

d Langford, W. H., Survey Department, Brisbane.
Lavarack, Major C. W., Survey Department, Brisbane.
P1 Leonard, G. A., L.S., Yorick Club, Collins Street, Melbourne.
d Lilley, Hon. Sir Charles, Kt., Chief Justice, Brisbane.
Lloyd, W. M., J.P., Brisbane.
Luck, H. C., F.R.G.S., J.P., Commercial Travellers' Club, Elizabeth Street, Brisbane.

d Known to be dead.

LIST OF MEMBERS—*continued.*

d Macpherson, Hon. P., M.L.C., Brisbane.
Marks, Hon. C. F., M.D., M.L.C., FELLOW, Wickham Terrace, Brisbane.
d McDonald, G. T., L.S., Rocklea.
d McDonnell, E., J.P., Brisbane.
d McDonnell, J., J.P., Brisbane.
d McMaster, J., M.L.A., Brisbane.
d Mein, His Honour Mr. Justice C. S., M.A., Brisbane.
P2 PP Miskin, W. H., Brisbane.
P1*Moore, T. B., F.R.S., Tas., New Norfolk, Tasmania.
d Morehead, Hon. B. D., M.L.A., Brisbane.
d P1†Muir, A., J.P., FELLOW, "Menzies," Brisbane.
d Muir, J., J.P., Brisbane.

O'Connor, T., L.S., "Duporth," Oxley, Brisbane.

d Persee, T. K., Survey Department, Brisbane.

Raff, H., L.S., Brisbane.
P1 Romilly, Hon. H. H., Port Moresby, New Guinea.
Russell, H. H. A., Immigration Department, Brisbane.
d Ryan, R. A., J.P., Brisbane.

d Stanley, F. D. G., F.R.S.B.A., Brisbane.
d P1 PP Stodart, J., FELLOW, Market Street, Brisbane.

d Thomson, John, M.B., &c., Brisbane.
P43 PP*Thomson, J. P., C.B.E., LL.D., Hon. F.R.G.S., &c., Hon. Sc. and Treasurer, Brisbane.
Trower, H., Survey Department, Brisbane.
d Tully, W. A., B.A., F.R.G.S., Surveyor-General, Brisbane.

Viner, A. J., Brisbane.

d P1 PP Waugh, J. N., M.D., Brisbane.
d Williams, W., J.P., Brisbane.
d Wilson, R. W., J.P., Brisbane.
d Wilson, W. H., Brisbane.
P1 Woolnough, Rev. G., M.A., Brisbane.
d Wright, H. T., Comm. R.N., Brisbane.

Members.

Adam, C. H., Messrs. W. Adam & Sons, Maryborough.
Adams, J. L., Thursday Island, Torres Strait, Queensland.
Ahearne, Dr. J., Wills Street, Townsville.
Alexander, Arthur S., Messrs. Alexander & Walker, Maryborough.
Allan, David Muir, Walker Avenue, Teneriffe, Brisbane.
Amiet, W. A., M.A., Barrister and Local Chairman, Sydney Street, Mackay.
Anderson, Alderman J., Warwick.
Annand, His Worship Alderman J. D., Toowoomba, Q.
Appel, Hon. J. G., M.L.A., "Sea Glint," Elston, Southport, Q.
Archer, Robt. S., Gracemere, Rockhampton.
Armati, G. V., Alexandra Street, Townsville.

d Known to be dead.

LIST OF MEMBERS—*continued.*

Armati, P. E., Sydney Street, Mackay.
Aroney, Peter, 470 George Street, Brisbane.
Ash, Rev. F. L., Albert Street Rectory, Mackay.
Ashton, W. G., P.M., Thursday Island, Queensland.
Atherton, E. A., Smithfield, *viâ* Redlynch, Cairns.
*Austen, L., Buna Bay, *viâ* Samarai.
Austin, Rev. A. H., M.A., The Manse, Hunter's Hill, Sydney, N.S.W.
Avenell, Ald. A. E., Stationer, Bourbong Street, Bundaberg.
Avenell, Fred W., Bookseller and Stationer, Bundaberg.

Bagley, C., Mackay.
Bain, J., Exhibition Grounds, Bowen Hills, Brisbane.
Baker, Fred, Commission Agent, Bundaberg.
Bardsley, G. H., "Hughenden," Logan Road, Coorparoo, Brisbane.
Bardwell, J. H., "Tranend," Cracknell Road, Annerley.
Barker, Miss E. J., B.A., Girls' Central School, Maryborough, Q.
Barnard, Chas. A., Coomooboolaroo, *viâ* Duaringa, Queensland.
Barnes, F. C., "Everest," Chaseley Street, Auchenflower, Brisbane.
Barnes, G. P., M.L.A., Palmerin Street, Warwick.
Barnes, J. H. S., Canning Downs, Warwick.
Barnes, Hon. W. H., M.L.A., J.P., Milsom Street, Coorparoo, Brisbane
*Barrett, Mrs. Walter, Eagle Junction, Brisbane.
*Beattie, Miss E. J., Girls' State School, Toowoomba, Q.
Beckenham, C. H., Aust. Bank of Commerce, Mackay.
Beebe, J., Works Department, Brisbane.
Beeran, G. V., Townsville.
Behan, Thos., Garfield Station, Jericho, Queensland.
Beirne, Hon. T. C., Brunswick Street, Valley, Brisbane.
Bell, E. T., M.L.A., Coochin Coochin, Dugandan, Queensland.
Bell, L. C., The Armidale School, Armidale, N.S.W.
Bertram, Hon. W., M.L.A., Speaker, Parliament House, Brisbane.
Biggs, J. E., Perkins and Co., Mary Street, Brisbane.
Black, Archie L., Victoria Street, Mackay.
Black, Fred, senr., Alfred Street, Mackay.
Bodleian Library (The Librarian), University of Oxford, England.
Booth, O. I., Messrs. Gobbett and Booth, Ruthven Street, Toowoomba.
Bottomley, Jas. Parker, Ipswich.
P2 Boyd, Major A. J., FELLOW, John Street, Toowong.
Brannelly, P. M., c/o Walter Reid and Co., Rockhampton, Queensland.
Broadbent, A., Local Chairman, Thursday Island, Torres Strait.
Brookes, G. B., Agnes Street, Range, Rockhampton.
Brown, Dr. E. E., Brisbane Street, Ipswich.
Brown, E. S., "Dawnie," Range, Toowoomba.
Brown, H. E., Ruthven Street, Toowoomba.
Brown, J. Leonard, J.P., "Woggonora," Cunnamulla, Q.
Brown, Miss A. Douglas, Local Hon. Sec., "Oakdale," Brisbane Street, Ipswich.
Brown, Miss M., B.A., Principal, Glennie School, Toowoomba.
Brown, Mrs., Central Girls' School, Warwick.
Browne, Major-General R. Spencer, C.B., F.R.G.S., c/o The Brisbane Newspaper Co., Ltd., Brisbane.

LIST OF MEMBERS—*continued.*

P1 Bryan, W. H., M.C., D.Sc., Queensland University, Brisbane.
Buhót, E. W. J., Health Department, South Brisbane.
Burns, William, c/o Messrs. Burns and Twigg, Rockhampton.
Burstow, Alderman T. S., Box 16, G.P.O., Toowoomba.
Buss, G. A., Planter, Bourbong Street, Bundaberg.
Byrne, Rt. Rev. Monsignor, V.G., P.P., St. Mary's, Ipswich, Q.

Calvert, Thomas, J.P., Box 67, Proserpine, Q.
Cameron, Colin, Foundry, Victoria Street, Mackay.
Cameron, Colonel D. C., C.M.G., D.S.O., M.P., Federal Members' Room, G.P.O., Brisbane.
Cameron, Dr. J. A., B.A., M.B., East Street, Ipswich.
*Campbell, A., J.P., Glengyle Station, Birdsville, Queensland.
Campbell, G. P., Messrs. Jas. Campbell and Sons, Ltd., Creek Street, Brisbane.
Campbell, Rev. R. S., The Rectory, Albert Street, Mackay.
Campbell, Victor F. J., Messrs. Jas. Campbell and Son, Ltd., Creek Street, Brisbane.
Carey, J., Rankin and Carey, Merchant, Gympie.
Cartledge, John Colenso, FELLOW, c/o P.O. Box 775, Durban, Natal, S. Africa.
Chadwick, Wm. Arthur, Ocean House, Martin Place, Sydney, N.S.W.
Chenoweth, Dr. Ern., District Hospital, Mackay.
Cherry, Miss P., Girls and Infants' State School, Mackay, Queensland.
Chippindall, A. H., Chemist, Bundaberg, Queensland.
Christsen, H. T., Merchant, Bourbong Street, Bundaberg.
Clark, Robert, Central Mill, Pleystowe, Mackay.
Clarke, Dr. P. S., Local Chairman, Abbott Street, Cairns.
Clarke, G. H., J.P., c/o Hodels, Ltd., Thursday Island, Torres Strait.
*Collins, Mrs. R. M., "Tamrookum," Beaudesert, Queensland.
Collins, W. A., Chemist, Cairns.
Colman, G. S.
Colwell, Rev. James, F.R. Hist. S., 4 Dover Road, Rose Bay, Sydney, N.S.W.
*Comino, T. S., Upper Kennedy Terrace, Paddington, Brisbane.
Connolly, Dr. T. P., Russell Street, Toowoomba.
Conlay, James De, Dragon Street, Warwick.
Cook, A. A., Greenmount, Mackay.
Copas, Miss A. M., Girls' Grammar School, Rockhampton.
Corlass, E. J., c/o Pumping Station, Mount Crosby, *vid* Ipswich.
Cornwell, E. M., Victoria Street (Red Arcade), Mackay.
Corran, A., Thursday Island, Torres Strait, Queensland.
*Corrie, Alex., J.P., FELLOW, Parbury House, Eagle Street, Brisbane.
Corser, E. S., Messrs. Corser and Co., Ltd., Maryborough.
Costello, Major E., M.L.A., Parliament House, Brisbane.
Costin, T. J. F., Ph.C., M.P.S., "Drumborisk," Vulture Street, East Brisbane.
Cramond, D., Ruthven Street, Toowoomba.
Cranley, J. P., Produce Merchant, Turbot Street, Brisbane.
Crawford, J. J. R., Sub-Collector Customs, Thursday Island, Torres Strait.
Cribb, H. S., Messrs. Cribb & Foote, Ipswich.

LIST OF MEMBERS—*continued.*

Croker, James, Barry House, Victoria Street, Mackay.
*Crorkan, T., J.P., ————
Cross, D. W., c/o Burns, Philp, and Co., Townsville.
Crowther, A. J., General Manager, Railway Department, Townsville.
Crowther, S., J.P., Brighton Road, South Brisbane.
Crunkhorn, W. H., Nebo Road, Mackay.
Cullen, Mrs. M., Fitzroy Street, Warwick.
P1 Cumbrae-Stewart, Prof. F. W. S., D.C.L., B.A., The University of Queensland, Brisbane.
Cumming, A. J., Government Printer, Brisbane.
Curlewis, F. C. P., Hambledon, *viâ* Cairns.
Curr, C. M., "Ruwenzori," Rosehill, Warwick, Q.
Curr, F. C., Oxley Street, Corinda, Q.
Curran, Mrs. Margaret, Wallace Street, Newtown, Toowoomba.
Currie, James, Palace Hotel, Bundaberg.

Dalzell, J. W., Bank of Australasia, Rockhampton.
Davenay, M. B., Palmerin Street, Warwick.
Davie, Charles, Anvil Stores, River Street, Mackay.
Davies, A. O. C., Education Department, Thursday Island, Queensland.
P1 Davies, His Lordship Rt. Rev. S. H., Bishop of Carpentaria, Thursday Island, Queensland.
Dawson, T. W. G., The Scots College, Victoria Road, Belle Vue Hill, Sydney, N.S.W.
Delaney, W. G., Solicitor, Nicholas Street, Ipswich.
Dent, Dr. R. C., Palmerin Street, Warwick.
Dixon, A. J., Manager, McKay Ltd., Stanley Street, South Brisbane.
Dobelle, Capt., 42 Cowles Road, Mosman, New South Wales.
Done, Rev. J., Mabuiag Island, Torres Strait, Queensland.
Donnan, Robt. L., Albert Street, Mackay.
Douglas, A. S., Slade College, Warwick.
Douglas, His Honour Judge, Local Chairman, Townsville.
Dowd, Paul E., Nambour, Queensland.
Dowling, J., William Street, Rockhampton.
Down, Alderman G., J.P., Ward's Chambers, Queen Street, Brisbane.
Dowrie, Messrs. G. and J., Engineers, Merivale Street, South Brisbane.
Draper, Alderman A. J., Abbott Street, Cairns.
Draper, Lionel, Hon. Local Secretary, A.M.P. Building, Cairns.
Dreyer, A. N., c/o Mr. J. M. Gibson, Racecourse, Mackay.
Drill, R., Alfred Street, Mackay.
Duhig, Dr. J. V., Wickham Terrace, Brisbane.
P1*Duhig, His Grace the Most Rev. Archbishop, D.D., President, "Dara," Brisbane.
Dunlop, Mrs. M., "The Quinta," Edmonstone Street, South Brisbane.
Dunn, A., Local Chairman, "Chronicle" Office, Maryborough, Q.
Dunn, Miss May, cr. Bourbong and Branyan Streets, Bundaberg.
Dunn, W. H. A., "Toowoomba Chronicle," Toowoomba.
P3 Dunstan, Benjamin, F.G.S., FELLOW, Chief Govt. Geologist, Brisbane.
Dunstan, Hon. T., M.L.A., Lands Department, Brisbane.
Dunwoodie, J. I., Thursday Island, Torres Strait, Q.

LIST OF MEMBERS—*continued.*

Eaves, W. B., Accountant, Targo Street, Bundaberg.
Eden, Mrs. D. R., Box 123, P.O., Stanthorpe, Q.
Edgerton, Dr. E. C., Grosvenor House, Bundaberg.
P1*Edwards, Edward E., B.A., FELLOW, Telegraph Building, Brisbane.
Effey, William, J.P., Central Buildings, Edward Street, Brisbane.
Egan, Dr. John, M.B., Palmerin Street, Warwick.
Eizenberg, H., Palmerin Street, Warwick.
Elliott, Eric, Messrs. Taylor and Elliotts Ltd., Charlotte Street, Brisbane.
Ellison, T. A., Surveyor, Survey Camp, *via* Eidsvold, Q'ld.
Evans, G., C.I.E., M.A.(Cantab.), Department of Agriculture and Stock, Brisbane.

Fahey, J. T., care of Railway Goods Office, Roma Street, Brisbane.
Fairfax, J. Hubert, J.P., "Marinya," Cambooya, Q.
Fairlie, James, Messrs. Fairlie and Sons, Maryborough.
Falkner, Dr. E. A., Margaret Street, Toowoomba.
Farquhar, J. R., c/o Q.M.E. Co., Lake's Creek, Rockhampton.
Farquhar, T. J., Pearler, Thursday Island, Queensland.
Farrar, Mrs. J., Albion Street, Warwick.
Ferguson, J. A., B.A., LL.B., 167 Phillip Street, Sydney, N.S.W.
Finemore, D. S. M., Dentist, Woongarra Street, Bundaberg.
Florence, Capt., Queensland Pilot Service, Thursday Island, Torres Strait.
*Foot, J. A., J.P., "Warrinilla," Rolleston, Queensland.
P1 Ford, F. B., FELLOW, Deputy Surveyor-General, Brisbane.
Forster, His Excellency Rt. Hon. Lord, G.C.M.G.
Forsyth, James, "Braelands," South Toowong, Brisbane.
Foster, A. T., Norman Crescent, Norman Park, East Brisbane.
Frankel, Philip, J.P., "Zonoma," Mark Street, New Farm, Brisbane.
Franklin, A. H., "Morning Bulletin" Office, East Street, Rockhampton, Queensland.
Fraser, J. A., C.E., Main Roads Board, Brisbane.
Fraser, Dr. W. A., M.B., B.S., Boonah.
Freeleagus, Christy, Consul for Greece, Freeleagus Chambers, Edward Street, Brisbane.
Frith, Mrs. J. O., "Rodway," Range, Toowoomba.
Furnivall, Mr. —., Government Teacher, Murray Island, Torres Strait, Queensland.

Gallagher, Dr. M. J., Albert Street, Mackay.
Gallagher, Mrs., Albert Street, Mackay.
P1 Galletly, A. M. M., Alfred Street, East Mackay.
Garrick, T. A., Manager Olympic Pictures, Bundaberg.
Gataker, M. L., Messrs. Gataker and Sons, Maryborough.
Gaukrodger, D. W., "Waiiti," Windermere Street, Ascot, Brisbane.
Geddes, A. J., Caroline Street, Rockhampton.
*Gibson, D. W., Authorised Surveyor, c/o Survey Office, Brisbane.
Gibson, W. G., Bingera, Bundaberg.
Gielis, Walter, Australian Steamships Ltd., Mackay.
Gilchrist, E. F., B.A., M.C.E., City Engineer, Brisbane.
Gillies, Hon. W. N., St. Osyth Street, Toowong, Brisbane.

LIST OF MEMBERS—*continued.*

Gillies, R. G., J.P., City Printing Works, Elizabeth Street, Brisbane.
Glissan, A. H. "Taabinga," Jellicoe Street, Toowoomba.
Glover, Rev. W. P., Warwick.
P1 Goddard, Professor E. J., Queensland University, Brisbane.
Godsall, Mrs. A. R., Ruthven Street, Toowoomba.
Goldfinch, H. A., Dentist, Cairns.
Gordon, C. G., North Street, Maryborough.
Gorringe, J. A., Authorised Surveyor, Kempton, Tasmania.
Grace, R. A., Thursday Island, Torres Strait, Queensland.
Graham, Mrs. Thos., Victoria Downs, *viâ* Katherine, Northern Territory.
Graham, Wm. E., Campbell Street, East Toowoomba.
Greene, Miss Alice J. Alison, Principal, Moreton Bay Girls' High School, Wynnum.
Greenaway, Mrs., Wantley Street, Warwick.
Greenham, Dr. Eleanor Constance, Edward Street, Brisbane.
Greensill, E. H. R., C.E., Central Railway Offices, Brisbane.
Grey, Mrs. J. R., F.L.S., Apuu, Moorea Island, *viâ* Papeete, Tahiti.
Griffin, William Charles, J.P., Somerset Farm, Gordon Vale, near Cairns, Q.
Griffith, A. A., Curzon Street, Toowoomba.
Griffiths, F. A., York Street, Ipswich.
P1†Groom, Hon. Sir L. E., K.C.M.G., M.A., LL.M., M.P., Vice-President. "Unara," Albert Street, Toowoomba.
Gruter, O. J., Dentist, Barolin Street, Bundaberg.
Gunn, Donald, "Boolarwell," Talwood, Q.
Gutteridge, Dr. Noel, Laboratory, Toowoomba, Queensland.

Hale, E. S., Merchant, Maryborough Road, Bundaberg.
Hall, F. R., Harbour Board Office, Cairns.
Hall, J S., F.A.I.S., Primary Producers' Bank, Balaklava, South Australia.
Ham, A., State School, Thursday Island, Queensland.
Hamilton, R. C., B.A., Principal, Technical College, Warwick.
Hanger, T., Principal High School, Gympie.
*Hannaford, S., J.P., Palace Hotel, Warwick, Queensland.
Hansen, W. H., care of Hansen and Dubois, Victoria Street, Mackay.
Harbord, H. H., J.P., Maytown, Queensland.
Harmon, D. C., Badu Island, *viâ* Thursday Island, Torres Strait, Q'ld.
Hart, Dr. B. L., East Street, Ipswich.
Hart, F. H., Messrs. Gibbs, Bright, and Co., Eagle Street, Brisbane.
*Hart, J. H., Ascot, Brisbane.
Hawley, Miss, M.P.S., Sydney Street, Mackay.
Hayes, The Rev. Leo, Kilcoy.
Heavey, The Rt. Rev. Lord Bishop, Cairns.
Henderson, G., J.P., "Elmbank," Laidlaw Parade, East Brisbane.
Herbert, Ald. J. A., Authorised Surveyor, Stuart Street, Toowoomba.
Herbertson, Frank, Cane Planter, Windermere, Bundaberg.
†Hertzberg, A., Messrs. A. M. Hertzberg and Co., Charlotte Street, Brisbane.

LIST OF MEMBERS—*continued.*

Hertzberg, Marcus, B.A., LL.B., Messrs. A. M. Hertzberg and Co., Charlotte Street, Brisbane.
Hetherington, Alderman J. W., J.P., Main Street, Kangaroo Point, Brisbane.
Hill, J. V., Town Clerk, Goondiwindi, Queensland.
Hill, L. C., Authorised Surveyor, Shire Street, Coorparoo.
Hillman, J., Victoria Street, Mackay.
Hockings, E. M., c/o Messrs. Hockings and Palmer, Denham Street, Rockhampton.
*Hodel, F. C., J.P., Cairns, Queensland.
Hodges, A. G., Head Teacher, East End State School, Bundaberg.
Hogarth, R. C., "Clio," Taylor Street, Toowoomba.
*Holt, W. H., F.R.C.I., "Glanwyne," Manly Point, Manly, N.S.W.
Holyoake, W. W., Chemist, Mackay.
Hopkins, Dr. P. W., District Hospital, Mackay.
Hopkins, Spenser, Strand, Townsville.
Horn, Dr. David, B.A., M.B., Ch.B., Ruthven Street, Toowoomba.
Horn, H., Flinders Street, Townsville.
P1*Horton, Leonard Cecil, J.P., FELLOW, "The Gunyah," Johnstone River, Q.
Hubbard, Rev. Percy, St. Alban's Rectory, Innisfail.
Hughes, C. H., Chemist, Maryborough.
Hulbert, Miss M., Girls' Grammar School, Rockhampton.
Humphreys, T. C., Surveyor, Sandakan, Borneo.
Hunt, Rev. E. Aldington, The Junior House, Church of England Grammar School, Brisbane
Hunter, R. D., Local Hon. Sec., Boys' State School, Warwick.
Hurworth, Dr. C. W., M.A.C.D. (Mel.), D.M.D. (Harvard), Toowoomba, Queensland.
Hutton, Mrs. J. C., Agnes Street, Range, Rockhampton.
Huxham, The Hon. J., Agent-General for Queensland, London.
*Hyne, H. J., Maryborough, Queensland.

Illingworth, W. E., Messrs. A. M. Hertzberg and Co., Charlotte Street, Brisbane.
Innis, Mrs. A., "The Ochils," Sarina, North Coast Line.
Irving, J. Washington, M.R.C.V.S.L., Ann Street, Brisbane.
Irving, W. Edmund, "Lorina," Kirkland Avenue, Coorparoo, Brisbane.
Irwin, Wm., "Daily News" Office, Warwick.

Jackson, Dr. E. S., "St. Helens," Stanley Street, South Brisbane.
Jackson, Thos. D., "Creagh," Chermside Street, Teneriffe, Brisbane.
James, J. P., Q.N. Bank, Thursday Island.
James, W., Q.N. Bank, Wood Street, Mackay.
Jamieson, Dr. J. I. M., Cairns, Queensland.
P2 Jensen, Dr. H. I., Mareeba, Queensland.
Jensen, Thor. H., Authorised Surveyor, Treasury Chambers, George Street, Brisbane.
John, Erich, 362 George Street, Brisbane, Queensland.

LIST OF MEMBERS—*continued.*

Johnston, A., Bank of N.S.W., Cairns.
Jolly, A. D., New Zealand Loan and Mercantile Agency Co., Townsville.
Jolly, Rt. Worshipful Ald. W. A., Town Hall, Brisbane.
Jones, Arthur, senr., J.P., Bondoola, *viâ* Rockhampton, Queensland.
Jones, G. E., Public Accountant, Victoria Street, Mackay.
P1†Jones, Hon. A. J., M.L.A., Vice-President, Mines Department, Brisbane, Queensland.
Jones, Hon. T. L., Messrs. Foggitt and Jones, Turbot Street, Brisbane.
Jordan, Rev. Father M., Presbytery, Nundah, Q.
Joyce, R., 228 Elizabeth Street, Brisbane.
Jubb, E. St. V., Ruthven Street, Toowoomba.
Just, John Stephens, City Electric Light Co., Boundary Street, Brisbane.

Kallinicos, G., Blue Bird Café, Flinders Street, Townsville.
Kellow, H. A., M.A., Local Hon. Secretary and Principal Grammar School, Rockhampton.
Kemp, Charles, "Hadleigh," Indooroopilly, Q'ld.
Kempster, Leonard, Farrington Hill, Alderley, Brisbane.
*Kennedy, A., Chesley Street, Auchenflower, Brisbane.
Kennedy, A. S., FELLOW, Hon. Auditor, Kingsholme, Fortitude Valley, Brisbane.
Kerr, R. A., M.A., B.Sc., Principal, Boys' Grammar School and Local Chairman, Ipswich.
Kidd, Rev. Walter, Gregory Street, Mackay.
Kidner, J. J., Local Chairman, National Bank of Australasia, Warwick, Q.
Kingel, Ald. T. W., Mayor, Rockhampton, Queensland.
Kingsford, F. J., Town Clerk, Warwick.
Kirby, A. R., c/o Messrs. A. W. Kirby, East Street, Rockhampton.
Kirby, Miss E., Guy Street, Warwick.
Kirkaldy, John, J.P., Lorraine, Cloncurry, N.Q.
Kirke, The Rev. G. K., St. Stephen's Church, Ipswich.
Krone, B. H., Principal, High School, Bundaberg.

Lade, F. W. H., 29 Sachville Street, Kew, Victoria.
Lamberton, H. F., care of W. H. Pantons Ltd., Mackay.
Landy, F. W., National Bank of Australia, Cairns.
Lane, John, Principal, Rangeville School, Toowoomba.
Langan, Dr. A. M., Cairns.
Lather, John, Wantley Street, Warwick.
Lather, Miss J. E. L., Girls' State School, Rocklea, Queensland.
Lawrance, Miss G. C., B.A., Principal, Glennie School, Toowoomba.
Leahy, Hon. P. J., 293 Queen Street, Brisbane.
Lenox-Conyngham, Sir Gerald P., Kt., M.A., F.R.S., Trinity College, Cambridge, England.
Leonard, T. J., Victoria Street, Mackay.
L'Estrange, W. M., M.I.E.E., FELLOW, G.P.O. Box 546, Brisbane.
*Lewis, A. A., J.P., ————
Londy Bros., Messrs., Brisbane Street, Ipswich.

LIST OF MEMBERS—*continued.*

Longman, H. A., Director, The Museum, Brisbane.
†Loose, The Rev. Thomas, Ascog Terrace, Toowong, Queensland.
Lucas, E. S., c/o Messrs. E. S. Lucas, East Street, Rockhampton.
Lundager, Miss M. C., Girls' State School, Mackay.

Macansh, Roland, c/o Gas Co., Warwick.
Macdonald, Hamilton, and Co. (The Manager), Mary Street, Brisbane.
Macdonnell, H. E., Surveyor, Cairns.
Macdonnell, H. K. N., Solicitor, Cairns.
Macfarlane, Mrs. C. A., 87 Shafston Avenue, Kangaroo Point, Brisbane.
Macintosh, Hugh, Hon. Librarian, Dornoch Terrace, South Brisbane.
Macintosh, T. B., J.P., Dornoch Terrace, South Brisbane.
Mackness, Miss C., B.A., Principal, Presbyterian Girls' College, Warwick.
Macleod, J., J. Macleod and Son, Jewellers, Bourbong Street, Bundaberg.
Macrossan, Mr. Justice H. D., B.A., Supreme Court, Brisbane.
Manning, W. J., "Daily Mercury," Mackay.
Marks, E. O., M.D., B.A., B.E., Wickham Terrace, Brisbane.
Maromattes, John, "Helios" Café, Roma Street, Brisbane.
Marsh, Alderman E. G., Goondiwindi, Queensland.
Mason, Dr. G. W., Stoke Street, Townsville.
Massey, The Rev. C. H., The Rectory, Cleveland, Queensland.
Mawdsley, A. A., Harbour Board Office, Rockhampton.
Mayers, G. R., c/o Bank of Queensland, Melbourne, Victoria.
Maynard, L. H., Local Chairman, George Street, Bundaberg.
McArthur, Robert, District Engineer's Office, Maryborough, Q.
McConachie, J., Manly, Queensland.
McDonald, W. H., c/o National Bank of Australasia, Townsville.
*McDonald-Terry, A. J., J.P., ————
McDonnell, Dr. Aeneas J., Margaret Street, Toowoomba.
McDonnell, Mrs. Aeneas J., Margaret Street, Toowoomba.
McFarlane, Rev. W. H., c/o Bishop's House, Thursday Island, Torres Strait.
McGrath, W. J., "Truth" Building, Queen Street, Brisbane.
McGregor, W., Pring Street, Ipswich.
McIntyre, D., "Strathmore," Toombeah, Queensland.
McKenzie, Dr. A. D., Russell Street, Toowoomba.
McKeon, J., Head Teacher, Central State School, Bundaberg.
McLaughlan, Rev. Father L. F., St. Joseph's Cathedral, Rockhampton, Queensland.
McLean, R. W., Railway Street, Toowoomba.
McLeod, J. J. W., "Terranora," Windermere Road, Hamilton, Brisbane.
McManus, R. F., Lake Street, Cairns.
McMaster, Hugh, "Devoncourt," Langside Road, Hamilton, Brisbane.
McNulty, J., Federal Hotel, Thursday Island, Torres Strait, Queensland.
McWilliam, T. M., Mowbray Terrace, East Brisbane.
Merchant, E., Targo Street, Bundaberg.

LIST OF MEMBERS—*continued.*

Miller, W., Government Teacher, Darnley Island, *viâ* Thursday Island, Torres Strait.
Millward, W. A., Technical College, Warwick.
Mobsby, H. W., F.R.S.A., FELLOW, Hon. Lanternist, Department of Agriculture and Stock, William Street, Brisbane.
†Morgan, F. J., Manager, National Bank of Australasia, Queen Street, Brisbane.
Morgan, Miss Edith M., Principal, Girls' Grammar School, Maryborough.
Morgan, Dr. T. H., "Milford," Wickham Terrace, Brisbane.
Morris, Dr. L., Caledonian Hill, Gympie.
Morsley, Rev. Cyril W., Sach Street, Cairns.
Morton, T., Morton and Morton, Solicitors, Maryborough, Q.
Moss, R. D., Messrs. Dalgety and Co., Elizabeth Street, Brisbane.
Moxon, W. E., General Manager, Adelaide S.S. Co., Eagle Street, Brisbane.
Moynahan, D. J., Chemist, Cairns.
Muir, Dr. R. A., Dental Surgeon, Edward Street, Brisbane.
Mullard, J., care of Wallis and Co., Wood Street, Mackay.
*Munro, E., "Darloo," Albion, Brisbane.
Murray, Abijah, Solicitor, Cairns.
Murray, His Excellency Hon. Sir J. H. P., K.C.M.G., FELLOW, Lieut.-Governor, Port Moresby, Papua.

Naish, G., State School, North Side, Mackay.
P5*Nathan, Rt. Hon. Sir Matthew, G.C.M.G., F.R.G.S., HON. FELLOW, Army and Navy Club, Pall Mall, London, S.W. 1, England.
Needham, F. H., J.P., 3 Knightsbridge, New South Head Road, Edgecliffe, Sydney, N.S.W.
Neilsen, G., George Street, Bundaberg, Queensland.
Nelson, D. J., Sinclair Street, Toowoomba.
*Noble, H. G., "Instarfield," Ascot, Brisbane.
Noonan, Jas. A., Palace Hotel, Sydney Street, Mackay.
Norris, H. L., Millaa Millaa, Queensland.
Nutting, Capt. Gerald, Station Street, Clayfield, Brisbane.

Oakeley, The Rev. Canon W. T., St. Luke's, Toowoomba.
O'Brien, D. A., Industrial Inspector, Local Hon. Secretary, Gympie.
O'Brien, Dr. D. P., Quay Street, Rockhampton.
O'Brien, F. L., Dentist, A.M.P. Buildings, Cairns.
O'Donoghue, T., Aboriginal Department, Thursday Island, Queensland.
Ogden, His Worship Ald. Anthony, Town Hall, Townsville.
O'Hara, R. E., J.P., c/o Dalgety and Co., Ltd., 65 Leadenhall Street, London, E.C. 3, England.
O'Leary, C., Protector of Aboriginals, Thursday Island.
Olley, D. W., c/o Samuel Allen and Sons, Cairns.
O'Regan, J. E., Mary Street, Gympie.
O'Reilly, Reginald De Vere, M.P.S., Palmerin Street, Warwick, Q.
O'Shea, W., Head Teacher, North Bundaberg State School, Bundaberg.
O'Sullivan, Miss J., c/o Girls and Infants' State School, Mackay.
Osterlund, W., Bank Manager, Thursday Island, Queensland.
Outridge, P. P., Redland Bay, Queensland.

LIST OF MEMBERS—*continued.*

Page, George J., Chemist, Bourbong Street, Bundaberg.
Paine, A. A., J.P., "Illalong," Brandon, *viâ* Townsville, Queensland.
Pares, Senor Luis Amadeo, "Hall of the Muses," Little Roma Street, Brisbane.
Parker, W. H., Chaseley Street, Auchenflower, Brisbane.
Parker, William Richard, L.D.S., Eng., Dentist, Country Press Chambers, Edward Street, Brisbane.
Parkes, J. N., Flinders Street, Townsville.
Parkinson, F. C., Elizabeth Street, Brisbane.
Paterson, Ald. F. J., Taylor Street, Toowoomba, Q.
Patterson, B. G., c/o Mount Morgan G.M. Co., Mount Morgan.
Patterson, H., Union Bank, Rockhampton.
Patterson, Dr. Mervyn, "Moringa," East Street, Ipswich.
Paull, S. P., Queensland Novelty Company, Elizabeth Street, Brisbane.
Payne, John C., Messrs. Payne and Payne, Solicitors, Bundaberg.
Pearce, W. J., Land Agent, Gympie.
Peart, John, C.E., M.I. Mech. E. (Lon.), Engineer for Water Supply, Metropolitan Water and Sewerage Board, Brisbane.
Peiniger, Miss, c/o Mr. Peiniger, Photographer, Flinders Street, Townsville, Queensland.
Pender, M. P., Solicitor, Brisbane Street, Ipswich.
Pennycuick, K. G., City Engineer's Office, Rockhampton.
Perrett, Arthur, J.P., "Kaboonga," Kinbombi, Q.
*Perry, G. H., J.P., c/o Messrs. Perry Brothers, Ltd., Elizabeth Street, Brisbane.
Peters, W., Health Inspector (Hon. Local Secretary), Bundaberg.
Phipps, J. H., King Street, East Brisbane.
Piggott, O. A., 310 Edward Street, Brisbane.
*Plant, Col. C. F., F.R.A.S., J.P., "Ferndale," Ashgrove, near Brisbane.
Pollard, A. T., "Wellhouse," Ironside, Toowong, Brisbane.
Ponsford, Dr., Quarantine Medical Officer, Thursday Island.
Poole, Miss C., Gibb Street, Kelvin Grove, Brisbane.
Pope, The Rev. W. G., c/o The Baptist Union, Little Collins Street, Melbourne, Victoria.
Porter, Capt. W., Thursday Island, Torres Strait, Queensland.
Porter, Wm. George, Wood Street, Mackay.
Pound, C. J., F.R.M.S., Yeerongpilly, Brisbane.
Price, Dr. T. A., Local Chairman, Russell Street, Toowoomba.

Quaid, J. D., J.P., "Abillon," River Bank, Hill End, South Brisbane, Queensland.

Rankin, R., Rankin and Carey, Merchants, Gympie.
Raymond, Ald. A. J., J.P., 178 River Terrace, Kangaroo Point, Brisbane.
Real, His Honour Mr. Ex-Justice, Coorparoo, Brisbane.
Redmond, W. J., P.O. Box 81, Warwick.
Reed, Dr. E. B., Barolin Street, Bundaberg.
Reed, Dr. J. Hastings, Upper Abbott Street, Cairns, Queensland.
Reed, H. A., Maryborough.

LIST OF MEMBERS—*continued.*

Reid, P. E. A., J.P., Queensland National Bank, Ltd., Brisbane.
Reye, A., Flinders Street, Townsville.
Rhodes, Capt. F., East Street, Rockhampton.
P1†Richards, Professor H. C., D.Sc., FELLOW, University, Brisbane.
Riley, Douglas, Thursday Island.
Rillie, Miss E., Central Girls' State School, Warwick.
Roberts, A. E., Box 57, G.P.O., Ipswich.
Roberts, Spencer, M.B., Ch.M. (Syd), "Finchley," Toowoomba, Queensland.
Robertson, A., Town Clerk, Townsville.
Robertson, Brig.-General J. C., C.B., C.M.G., D.S.O., Taylor Street, Toowoomba.
Robertson, Dr. (Major) W. N., C.B.E., 69 Wickham Terrace, Brisbane.
*Robertson, Mrs. H., "Harelvyn," Abbott Street, New Farm, Brisbane.
Robinson, Sir T. B., G.B.E., K.C.M.G., 7 Cambridge Gate, Regent's Park, London, N.W.
Ross-Munro, W., "Ross-Roy," Indooroopilly, near Brisbane.
Rowe, Joseph, Bundaberg, Queensland.
Rowland, J. D., East Warwick.
Rowland, P. F., M.A., Local Hon. Secretary, Boys' Grammar School, Townsville.
Rudd, F. L., c/o Walter Reid and Co., Rockhampton.
Rudd, William Henry, J.P., FELLOW, Local Chairman, Messrs. Walter Reid and Co., Rockhampton, Queensland.
Russell, A. W. L., Education Department, Thursday Island, Queensland.
Russell, R., Jane Street, Manly, Queensland.
Ruthning, A. F. T., Solicitor, T. and G. Building, Queen Street, Brisbane.

Sanderson, Mrs. Eva E., Dentist, Bourbong Street, Bundaberg.
Sandison, J. T., Victoria Pottery, Ipswich Road, South Brisbane.
Sargent, John, Merivale Street, South Brisbane.
Saunders, G. J., M.Sc., B.E., Principal, Technical College, Ipswich.
Schmidt, Dr. Egmont, Barolin Street, Bundaberg.
Schooley, B. L., C.E., International Well Boring Co., Ann Street, Brisbane.
Schrock, R. C., Sturt Street West, Townsville.
Scott, Dr. E. W. Kerr, Brunswick Street, Brisbane.
Scott, Mrs. E. J. Monerieffe, "Wandowalla," Warwick.
Sealrook, George Kenilworth, J.P., F.R.C.I., Albert Street, Brisbane.
Serisier, W. J., P.O. Box 3, Goondiwindi.
Sexton, R. E., C.E. (Chief Engineer), Central Railway Offices, Brisbane.
Shackel, T. W., F.S.S., Thorn Street, Kangaroo Point, Brisbane.
Shannon, J., "Endrim," Sherwood Road, Toowong, Brisbane.
Sheldon, E. G., Surveyor, Gympie.
*Sherherd, Arthur, J.P., Milray Station, Pentland, N.Q.
Shiel, The Rt. Rev. Lord Bishop, Agnes Street, Range, Rockhampton.
Short, Rev. Harold, F.R.G.S., London Mission, Daru, Papua, *viâ* Thursday Island.
Simpson, H. G., Aboriginal School, Thursday Island, Queensland.

LIST OF MEMBERS—*continued.*

Sinclair, C. E., Hastings Street, Thursday Island.
Sinclair, H. J., C. Engineer, Millaquin, Bundaberg.
Sinclair, Rev. John A., Sheridan Street, Cairns.
Skyring, T. D., Corberry Street, Rockhampton.
Skyring, Z. D. S., Pie Creek, Gympie.
Slade, W. B., J.P., c/o A. E. Slade, "Glenbar," Glengallon Road, Warwick, Q.
Smith, C. E., Townsville.
Smith, Dr. J. S., Guy Street, Warwick.
Smith, E. Eldridge, care of Harbour Board, Mackay.
Smith, H. F., J.P., Francis Street, Eagle Junction, Brisbane.
Smith, Miss M. W., Girls' Grammar School, Rockhampton.
Smith, Rev. W. C., Lake Street, Cairns.
P1 Sorrell, John Arnold, FELLOW, Staff Surveyor, Rockleigh, Wagga Wagga, N.S.W.
Spathis, P., Brisbane Street, Ipswich.
Spence, Lockhart Horsburgh, J.P., c/o E. Rich and Co., Circular Quay, Sydney, N.S.W.
Spencer, A. R., Dental Surgeon, 12 Queen Street, Brisbane.
P1 PP Spowers, Allan A., FELLOW, Corinda, Brisbane.
Standish, R. A., Q.N. Bank, Rockhampton.
P1 Stanley, G. A. V., Science Research Scholar in Geography, 1925, University of Sydney, N.S.W.
*Steele, E., Stainburn Downs, Aramac, Queensland.
Steele, J. D., J.P., Authorised Surveyor, "Heatheote," Southport, Queensland.
Sterne, H., C.E., Rosenthal Shire Office, Warwick.
Stewart, E. D., Australian Bank of Commerce, Ipswich.
Stiles, H. T., c/o Hume and Gostling, San Martin 235, Buenos Aires, Argentine, South America.
Stillman, W. J. E., Merchant, Cairns.
Stirling, A. C., C.E., District Engineer, Many Peaks, Queensland.
Stitt, James, Warmington Street, Ithaca, Brisbane.
Stone, J., Margaret Street, Toowoomba.
Storey, C., Victoria Street, Mackay.
Sullivan, A. T., Thursday Island, Torres Strait, Queensland.
Svensen, Captain O., "Norway," Galloway's Hill, Norman Park, Brisbane.
Sykes, F. B., Solicitor and Local Chairman, Gympie.

Taylor, E., J.P., Messrs. Taylors and Elliotts, Ltd., Wholesale Chemists, Charlotte Street, Brisbane.
Taylor, Capt. R. S., Assoc. I.N.A., Lloyd's Surveyor, Eagle Street, Brisbane.
Taylor, T. Mel., Manager, Morcheads, Ltd., Brisbane.
†Taylor, Hon. W. F., M.D., FELLOW, &c., Vice President and Chairman of Council, Preston House, Queen Street, Brisbane.
Theodore, Hon. E. G., Bowen Terrace, Brisbane.
Thomas, J. L., Gympie.
Thompson, Dr. Robert, "Bunya Bunya," Wickham Terrace, Brisbane.
P5 Thomson, Capt. W. C., FELLOW, "Loma Langi," Ascot, Brisbane.

LIST OF MEMBERS—*continued.*

Thorpe, T. P. L., Q.N. Bank, Townsville.
Thynne, Col. Hon. A. J., Vice-Chancellor of the Queensland University, Highgate Hill, South Brisbane.
P1 Tolmie, Hon. James, Margaret Street, Toowoomba.
Tristram, Eric, Hope Street, South Brisbane.
Tritton, F., George Street, Brisbane.
Trost, A. A., Kingshill Road, Ipswich.
Tryon, Henry, Government Entomologist and Vegetable Pathologist, Department of Agriculture and Stock, Brisbane.
Turnbull, George, Thursday Island, Queensland.
Turnbull, Wm., Hicks Island, *viâ* Thursday Island, Torres Strait.
Turner, S. R., Dentist, Bazaar Street, Maryborough.

*Vernon, Dr. G. H., M.C., Local Hon. Secretary, Thursday Island, Torres Strait, Queensland.
Vidgen, H. G., Thursday Island, Torres Strait, Q.
Vollbon, E. A., Bundaberg.
Voss, Dr. F. H. V., "Penmaen," Rockhampton.

Waddell, W. A., J.P., "Hiawatha," Esplanade, Cairns, Queensland.
Walker, Captain T. W., Albion Street, Warwick.
*Wallace, W. A. J., Survey Office, Quala Lumpur, Federated Malay States.
Walsh, A. D., J.P., FELLOW, General Manager, Messrs. Dalgety and Co., Elizabeth Street, Brisbane.
Walsh, E. P., Chemist, Mary Street, Gympie.
Walsh, J. A., Messrs. Fitzgerald and Walsh, Queen Street, Brisbane.
Warren, C. C., 24 Wharf Street, Brisbane.
Warrian, C. G., J.P., Local Hon. Secretary, Hill Street, Toowoomba.
Watson, The Rev. A. T., The Manse, Warwick.
*Weedon, H. S., C.E., L.S., Box 44, G.P.O., Sydney, N.S.W.
Weir, W., Town Clerk, Sydney Street, Mackay.
Wetherell, R., Manager, Brabant and Co., Charlotte Street, Brisbane.
Whatmore, G. W., Director and Manager, Queensland Motor Agency, Adelaide Street, Brisbane.
Wheatland, Dr. F. T., M.B., B.S., Commonwealth Health Laboratory, Toowoomba, Queensland.
White, Miss Helen, M.A., Girls' Grammar School, Ipswich.
White, W. T., Authorised Surveyor, "Wynola," Campbell Street, West Toowoomba.
Whitehead, A. E., Chemist, Nicholas Street, Ipswich.
Whitehead, R. H., Stewart Street, North Bundaberg.
*Whittingham, Hon. Arthur Herbert, "Mayfield," Hamilton, Brisbane.
Whittle, Dr. H. C., John Street, Maryborough.
P2†Wienholt, Capt. Arnold, D.S.O., M.C., FELLOW, Kalbar, Queensland.
Wilkinson, A. E., Town Clerk, Cairns.
Wilkinson, J. S., c/o Dalgety and Co., Townsville.
†Wilkinson, L. A., Chemist, Queen and George Streets, Brisbane.
Williams, Arthur F., Metropolitan Hotel, Albert Street, Mackay.
Williams, F. Stanley, Sydney Street, Mackay.
Williams, Jas. F., Local Hon. Lanternist, "Wahroonga," North Street, Mackay.

LIST OF MEMBERS—*continued.*

P1 Williams, Thos. A., Barambah Aboriginal Settlement, Murgon.
Williams, W. W., Darwin, Northern Territory.
Willmett, F. T., Rockport, Townsville.
Wilson, Lieut. A. G., Staff Corps, Thursday Island, Queensland.
Wilson, A. W., J.P., General Agent, Charters Towers, Q.
Wilson, Dr. G., M.A., Brisbane Street, Ipswich.
Wilson, John P., J.P., FELLOW, 478 Adelaide Street, Brisbane.
P2 Wilson, S., P.M., Longreach, Queensland.
Wilson, W. A., J.P., FELLOW, Flinders Parade, Sandgate.
Wilson, W. B., Grafton Street, East Warwick.
Winnett, W. G., Slack's Creek, Kingston, Queensland.
Wonderley, Mrs. R. G., "Caloola," Taylor Street, Toowoomba.
Woodard, Miss A. T., c/o Mrs. St. M. Jones, "Windermere," Chaseley Street, Auchenflower, Brisbane.
Woodward, F. G., National Bank of Australasia, Ltd., Brisbane Street, Ipswich.
Wyatt, J. Palmer, Victoria Bridge Hotel, Townsville.
Wyper, W., Merchant (Managing Director, Wyper Bros.), Bundaberg.

Yearwood, Miss E. M., "La Fortune," Perrott Street, Paddington, Brisbane.
Young, J., John Street, Thursday Island, Torres Strait.

Honorary Members.

Professor Sir T. W. E. David, K.B.E., C.M.G., D.Sc., F.R.S., University, Sydney, N.S.W.
Lady Goold-Adams.
F. W. Gregory, Sydney, N.S.W.
P1 The Right Hon. Lord Lamington, G.C.M.G., G.C.I.E., B.A., F.R.G.S., Hon. F.R.S.G.S., &c., Lamington, Lanarkshire, Scotland.
Lady Morgan, "Mia Mia," Foxton Street, Indooroopilly, Brisbane.
Lady Nelson, "Gabbinbar," Toowoomba, Q.
Lady Norman, London, England.
Viscountess Novar of Raith, Kirkcaldy, Scotland.
Her Excellency Lady Stonehaven, Federal Government House, Melbourne, Victoria.
P1 Associate-Professor T. Griffith Taylor, D.Sc., B.E., F.R.G.S. University, Sydney, N.S.W.

Honorary Corresponding Members.

Cyrus C. Adams, F.A.G.S., Editor, "Bulletin of the American Geographical Society," Broadway, at 156th Street, New York City, U.S.A.
P2 His Excellency Sir W. L. Allardyce, K.C.M.G., Government House, St. Johns, Newfoundland.
P1 Lieut.-General Sir Henry Chauvel, G.C.M.G., K.C.B., Military Headquarters, Melbourne, Victoria.
P2 Dr. J. V. Danes, Consul-General, Czecho-Slovak Republic, 40 Bayswater Road, Darlinghurst, Sydney, N.S.W.

LIST OF MEMBERS—*continued.*

P1 Professor Richard Elwood Dodge, Teachers' College, Columbia University, New York City, U.S.A.

Dr. Karel Domin, Asst. Professor of Botany, Bohemian University, Prague.

His Honour Dr. W. F. Frear, 303 Stangenwald Buildings, Honolulu, Hawaiian Islands.

Hon. W. T. Harris, Ph.D., LL.D., late Commissioner of Education, Washington, D.C., U.S.A.

The Hon. W. A. Holman, K.C., Ex-Premier of New South Wales, Northfield Chambers, Phillip Street, Sydney.

Sir. J. Scott Keltie, LL.D., Editor "Statesman's Year Book," &c., Royal Geographical Society, Kensington Gore, London, S.W., England.

P20 R. H. Mathews, L.S., Associé étranger Soc. d'Anthrop de Paris; Corr. Memb. Anthrop. Soc., Washington; Corr. Memb. Anthrop. Soc., Vienna; Local Correspondent for Australia, Royal Anthrop. Inst. London; "Carcuron," Hassall Street, Parramatta, N.S.W.

Cathcart, William Methven, M. Inst. C.E., F.R.S.E., F.R.I.B.A., Club Arcade, Durban, South Africa.

P3 H. R. Mill, LL.D., D.Sc., F.R.S.E., F.R.G.S., F.R.S.G.S., Hill Crest, Dorman's Park, Surrey, England.

Dr. Eric Mjöberg, Director Sarawak Museum, Kuching, Sarawak, Borneo.

Rev. Dr. E. F. Pigot, S.J., Science Master and Director of the Observatory, Riverview College, Sydney, N.S.W.

Captain G. H. Pitt-Rivers, A.D.C., Federal Government House, Melbourne, Victoria

P3 Captain J. F. Ruthven, R.N.R., F.R.G.S., Junior Carlton Club, Pall Mall, London, S.W.

J. H. Spowers, Federated Malay States.

Frederick Stubbs, F.R.G.S., Rotorua, New Zealand.

Mrs. J. P. Thomson, ————

Rt. Rev. Gerard Trower, D.D., Bishop of North Australia, Port Darwin.

P. Tsitsilias, LL.D., Avocat, 42 Miaoulis Ave., Pireus, Greece.

A. J. CUMMING, Government Printer, Brisbane

QUEENSLAND
GEOGRAPHICAL JOURNAL

(NEW SERIES).

INCLUDING THE PROCEEDINGS OF THE ROYAL GEOGRAPHICAL SOCIETY OF AUSTRALASIA (QUEENSLAND).

42nd—44th SESSIONS, 1926-29.

J. P. THOMSON, C.B.E., LL.D., HON. F.R.S.G.S., ETC., ETC., *Honorary Editor.*

The Authors of Papers are alone responsible for the opinions expressed therein.

VOLS. XLII.-XLIV.

PUBLISHED AT BRISBANE BY THE ROYAL GEOGRAPHICAL SOCIETY OF AUSTRALASIA (QUEENSLAND).

NOTE.—All communications should be addressed to the Hon. General Secretary, at the Rooms of the Society, Turbot Street, Brisbane.

The Royal Geographical Society of Australasia

(QUEENSLAND). Founded 1885.

OFFICERS AND COUNCIL ELECTED
for the 45th Session - - 1929-30

Patron :

His Excellency Rt. Hon. LORD STONEHAVEN, G.C.M.G., D.S.O., F.R.G.S., Governor-General.

Vice-Potrons :

Rt. Hon. S. M. BRUCE, C.H. M.C., C. de G., LL.D., D.C.L., &c., Prime Minister.

Hon. A. E. MOORE, M.L.A., Premier of Queensland.

President :

His Grace ARCHBISHOP DUHIG. D.D., F.R.G.S.A.

Hon. President :

His Grace ARCHBISHOP SHARP, D.D.

Vice-Presidents :

Hon. Sir L. E. GROOM, K.C.M.G., K.C., M.A., LL.M., M.P. ;
Col. D. C. CAMERON, C.M.G., D.S.O., M.P. ; Hon. W. H. BARNES, M.L.A. ;
Hon. R. M. KING, M.L.A.

Hon. General Secretary and Treasurer :

Dr. J. P. THOMSON, C.B.E.

Chairman of Council :

A. HERTZBERG, Esq.

Councillors :

E. T. BELL, Esq., M.L.A. Hon. WM. BERTRAM.
B. DUNSTAN, Esq. F. J. MORGAN, Esq.
R. SANDERSON TAYLOR, Esq.

Hon. Librarian :

Bankers :

COMMONWEALTH SAVINGS BANK.

Hon. Auditor :

A. S. KENNEDY, Esq., F.R.G.S.A.

Hon. Lanternist :

H. W. MOBSBY, Esq., F.R.S.A., F.R.G.S.A.

Hon. Solicitors :

Messrs. J. F. FITZGERALD and WALSH.

Contents.

VOLS. XLII.–XLIV.

ANNIVERSARY ADDRESS, BY HIS GRACE ARCHBISHOP DUHIG .. 1

LIFE IN THE QUEENSLAND TROPICS, BY DR. A. H. BALDWIN .. 5

THE NORTHERN TERRITORY, BY W. WYNN WILLIAMS 22

THE INFLUENCE OF GEOGRAPHY ON WAR, BY BRIG.-GENERAL C. H. FOOTT 33

PAPUAN FOLK LEGENDS, BY LEO AUSTEN 44

MITCHELL RIVER, BY REV. J. DONE 64

A REVIEW OF THE ABORIGINE, BY T. A. WILLIAMS 69

CANBERRA LECTURE, BY CAPT. J. FRANCIS 75

ANNIVERSARY ADDRESS, BY HIS GRACE ARCHBISHOP DUHIG .. 82

ANTARCTICA THE SOURCE OF SEASONAL AND CLIMATIC CHANGES, BY DR. J. P. THOMSON 86

PROCEEDINGS OF THE ROYAL GEOGRAPHICAL SOCIETY OF AUSTRALASIA (QUEENSLAND) 90

FORTY-FOURTH ANNUAL SUMMARY, 1928-1929. 91

STATEMENT OF ACCOUNTS, 1928-1929 95

PROVINCIAL BRANCHES 96

THE THOMSON FOUNDATION MEDAL AWARDS 96-97

THE THOMSON PRIZE OF THE R.G.S.A. 97

DIPLOMAS OF FELLOWSHIP 98

FOUNDATION MEMBERS 99

MEMBERS, LIST OF 100

HONORARY AND CORRESPONDING MEMBERS 114

CONDITIONS AND PRIVILEGES OF MEMBERSHIP ..PAGE 2 OF COVER

THE THOMSON FOUNDATION GOLD MEDAL, CONDITIONS OF AWARD AND OF COMPETITION .. .. .. PAGES 3 AND 4 OF COVER

ROYAL GEOGRAPHICAL SOCIETY,

LONDON.

CONDITIONS OF FELLOWSHIP.

The Royal Geographical Society (London), our parent Society, is desirous of increasing its fellowship with those anxious to further the promotion and diffusion of geographical knowledge by their interest and support, as well as with those able to take a more active part in the work of discovery and exploration. The entrance fee of the Society is £5, annual subscription £3, and candidates have to be proposed and seconded by Fellows. Members of the Royal Geographical Society of Australasia (Queensland), desirous of becoming members of the Royal Geographical Society of London, should communicate with Dr. J. P. Thomson, Honorary General Secretary of the Queensland Society.

Queensland
Geographical Journal

Nos. 28–30. New Series. 1929. Vols. XLII.–XLIV.

ANNIVERSARY ADDRESS TO THE ROYAL GEOGRAPHICAL SOCIETY OF AUSTRALASIA (QUEENSLAND).

By His Grace Archbishop Duhig, D.D., F.R.G.S.A., President.*

Your Excellency, Your Grace, Ladies and Gentlemen,—

I feel I must begin by expressing what I am sure is the feeling of everyone at this meeting—regret that His Excellency the Governor, owing to his absence from Brisbane, is unable to be with us this evening, and still further regret that, on account of his manifold duties and the continual tax on his time in endeavouring to become acquainted with every part of the State, His Excellency has found it necessary to relinquish his office as President of this Society.

Members are aware that before Sir John Goodwin left London to take up his appointment as Governor of Queensland I resigned the office of President of the Royal Geographical Society, which I regarded myself as holding temporarily in order that we might be at liberty to offer it to His Excellency, who we felt would be, in that office as in the office of Governor of the State, a worthy successor to Sir Matthew Nathan. We can only emphasise how very keenly we feel that His Excellency found it necessary to resign after being our President but for a very short time. It was only through the unanimous desire of the Council that I consented to allow my name to be sent forward on this occasion for the post of President, because I felt very sincerely that there were many who would fill this position much more satisfactorily than I could hope to fill it. While at all times prepared to do whatever is in my power for the interests of the Society, I shall be glad to vacate the office of President whenever a more suitable candidate for that office is presented.

* Delivered at the Annual General Meeting, 5th July, 1928.

I join with Dr. Thomson in expressing regret at the losses the Royal Geographical Society has sustained during the year through the death of some of its most prominent officers and members.

It may be of advantage to recall briefly this evening the history of the Royal Geographical Society in Queensland. Locally, the Society was instituted with the view of promoting the interests of geographical science in its widest sense; of encouraging exploration and pioneering enterprises in Australasia—including the Commonwealth of Australia, the Dominion of New Zealand, New Guinea, and the Pacific Islands—and of furthering the study of physical and commercial geography.

Besides the headquarters at Brisbane the Society has at present eleven provincial branches in Queensland where occasional popular lectures are given by distinguished travellers and other eminent authorities, on subjects of wide interest and importance.

In 1886 the Society assumed the title "Royal" by Royal Warrant from Queen Victoria through Lord Carrington, a former Governor of New South Wales. It is affiliated with the parent Royal Geographical Society, London, and with the Royal Scottish Geographical Society, Edinburgh, Glasgow, Aberdeen, and Dundee. Its official organ is "The Queensland Geographical Journal," of which forty-one volumes have been issued and circulated to public libraries, institutions, and kindred bodies all the world over, being universally acknowledged and recognised as a scientific publication of outstanding value and importance. This has often been attested by reprints from its pages of extracts and articles of merit that have appeared from time to time in the exchange scientific literature of the world, with which the Society's valuable and comprehensive library has been enriched. At present the library contains some 30,000 titles, besides valuable atlases, many maps, and works of reference requiring more space for their accommodation than is at present available. In pursuit of its purpose the Society was instrumental in procuring from the Queensland Government a grant of £1,000 for the Everill Fly River Scientific Expedition, organised and sent out by the Sydney, Melbourne, and Queensland Administrative Councils of the Society in 1885. This paved the way for the extension of exploration and the development of British enterprise in New Guinea, besides adding to the map of that country an important geographical feature, the Strickland River, named in honour of the President of the New South Wales branch of the Society. At a later date a similar grant of £1,000 was obtained by the Society in Queensland from the State Government

for the Captain Scott National Antarctic Expedition, being the only Australian contribution to that great undertaking, and was given, according to statements made by the late Sir Clements Markham and Sir Henry Wylie Norman at an anniversary meeting of the parent Society in London, in recognition of Dr. J. P. Thomson's great *unpaid public and scientific services* as founder of the Australasian Society. In co-operation with the Queensland Government, the Society in 1909 sent Dr. Thomson, accompanied by Mr. E. E. Edwards, to the Gulf of Carpentaria to locate and identify the site of the most northern camp of the ill-fated Victorian explorers, Burke and Wills, on the Boyne River. The illustrated result of this interesting enterprise is published in the 25th volume of the Society's Journal.

In 1922 the Society, on its own initiative and cost, inaugurated the Great Barrier Reef Committee, having for its purpose the scientific and economic investigation of that remarkable physical structure adjacent to the eastern shores of Queensland. And in other movements of public importance the State and Commonwealth at large owe acknowledgment and recognition of the Society's activities extending over the last forty-three years. A notable example of this is furnished by the National Park on the southern border lands of the State, the dedication of which, as a reservation for public use, owes not a little to the Society's early activities in that locality, and the publicity thereby given to the advantages of that picturesque and salubrious area as a health resort. But these are only brief references to some of the more outstanding achievements of the Society's active life, reaching the middle of the fifth decade, and which has continued from the commencement without a break—probably a unique record of earnest endeavour in promoting the interests of geographical science and the dissemination of knowledge generally among all classes of people.

At headquarters, meetings of the Society are held monthly (except during the midsummer recess from December to March), at which illustrated popular lectures and papers are given on appropriate subjects of wide interest and importance by recognised authorities, covering a world-wide range and embracing the field of earth-knowledge, preference being conceded to Australasian geography. In this branch of its activities the Society has numbered amongst its distinguished contributors some of the world's greatest authorities, including H. M. Stanley, Ronald Amundsen, Professor J. W. Gregory, Sir Augustus Gregory, Sir John Murray, Sir William MacGregor, Lord Novar, Lord Lamington, Lord Chelmsford, Sir Samuel Griffith, Field Marshal Sir

Henry Wylie Norman, Lord Stonehaven, General Chauvel, Sir George Wilkins, Sir Matthew Nathan, and many other notable contributors.

Branches.—In the provinces eleven branches of the Society have been established, and these extend from Thursday Island in the north to Warwick in the southern division of the State. At each centre there is a chairman and local secretary, who regulate the activities of the branch and arrange for lectures from time to time as occasion may arise or opportunity offer.

Occasionally a lecture given at headquarters on some subject of wide interest or special importance is repeated to the near-at-hand branches, and may even reach the far northern centres at Cairns and Townsville. But in any case all the branches are visited periodically by Dr. Thomson, who holds himself in readiness to assist in stimulating interest in the branch activities whenever necessary. Located on an interesting and favourably situated outpost, the Thursday Island branch is perhaps the most active of all, having obtained important information and valuable historical material concerning the pearling industry and early settlement in Torres Strait.

In furtherance of its objects, the Society has in its gift a valuable gold medal, established in honour of its founder, Dr. J. P. Thomson, and awarded for original contributions to geographical literature and for eminent services to geographical science, the last award being made to Flight Commander Hinkler for his service to the science of aviation by his flight from England to Australia, February 1928.

As indicating the broad national and cosmopolitan character of the Society (distinct from a local or State body) as a "great Australian institution for the advancement and popularisation of scientific knowledge" (to quote Sir Matthew Nathan in moving a resolution on the occasion of the fortieth anniversary of the foundation of the Society in favour of Dr. Thomson, founder), it need only be mentioned that the office of Patron is adorned by His Excellency the Governor-General, and that of Vice-Patron by the Right Honourable the Prime Minister of the Commonwealth of Australia.

Geographical science recognises no State or parochial lines of demarcation, its workers consisting of a confraternity or brotherhood of harvesters devoted to a common cause in the promotion and diffusion of knowledge among men of all nations, irrespective of colour, creed, or politics, to all of which they are strangers.

LIFE IN THE QUEENSLAND TROPICS.

Suitability for Whites.*

By A. H. Baldwin, M.B., D.T.M. and H.

The common idea, of those living in temperate climates, of the tropics is a region with luxuriant vegetation, abounding in tropical fruits and coconut palms, while gorgeous butterflies and birds of paradise help to beautify the scene. Again, they imagine that the tropics for the white man are synonymous with death, coming in the guise of malaria, yellow fever, black-water, &c. No doubt, for this false conception we have to thank the modern school of adventure writers, and the accounts of old voyages made at a time when man was ignorant of the laws necessary for the maintenance of health in the tropics. Voyage after voyage, and settlement after settlement, encountered disasters which were primarily due to man meeting a foe which was invisible and not understood by him. This foe was tropical disease rather than climate. It must be admitted that there are areas of the tropics which are particularly unhealthy. Some of these areas are unhealthy on account of disease, others because of their geographical and topographical peculiarities. But certain areas outside the tropics are also unhealthy for these very same reasons. It must be realised at this point that, while geographically the tropics extend from 23 deg. 27 min. N. latitude to 23 deg. 27 min. S. latitude, the delimitation is not suitable for defining the area of Tropical Climate.

Soupan suggests that climates should be classified as follows:—

1. Tropical or warm climates extending from the equator to the mean annual isotherm of 68 deg. F.
2. Temperate climates extending from the 68 deg. isotherm to localities which have a temperature of 50 deg. F. for the warmest months of the year.
3. Cold climates which have a colder climate than class 2.

Regarding Australia from this viewpoint, we find in class 1 all that part of Australia which would be north of a line drawn east

---

* Read at the Townsville Branch of the Royal Geographical Society of Australasia, September 1928.

and west through the most southern part of the Gulf of Carpentaria. The second class of climate would be approximately limited southward by a line drawn east and west through the most northerly portion of the Great Australian Bight; and the third area would lie south of this line. It will be seen that climatologically the greater part of Australia enjoys a temperate or cold climate.

The climate zones would coincide with the geographical zones were the northern hemisphere symmetrical with the southern—in other words, if both had similar shaped land masses arranged in equal areas at equal distances from the poles, altitudes of both approximately equal, a similar distribution of oceans with equivalent depths at various distances from the equator. But we know that this is not so. The main bulk of land is situated in the northern hemisphere, which is consequently the hotter.

Now, let us deal more particularly with tropical Queensland. I was born in Victoria myself, and since I left that State I have travelled very widely. I think I may lay claim to the fact that I am strictly without prejudice as regards any interstate jealousy. From what I have seen I judge tropical Queensland to be without rival in Australia as a region of infinite possibilities. In its power to withstand a succession of droughts, in its quick recovery when a good season occurs, in its mineral wealth, in its timber, in its rich scrub lands, in its alluvial valleys, and in its great rolling downs fit for sheep or cattle, it but waits for population, which will in the course of time render it one of the richest parts of Australia. And that population is coming. At the present rate of increase the predicted populations of the following towns in the course of forty-two years will be as follows:—

Cairns	32,000
Townsville	111,000
Rockhampton	99,000
Innisfail	9,000
Bowen	9,000

The Queensland tropics are divided geographically into three zones, with different climates. A narrow and exceedingly fertile coastal strip with a high rainfall in which most of the population and larger towns are found. This is the true tropical belt. Next we find an area of plateau, from 1,500 to 2,000 feet, which commences at a distance varying from 20 to 100 miles from the coast. In this area the climate is generally delightful, the nights being

colder than in the coastal area. This plateau gradually slopes away into the great western plains with a dry climate. The climate is continental in type, with hot days and cold nights.

The area of tropical Queensland is 359,000 square miles, which is larger than New South Wales, four times the area of Victoria, and fourteen times the area of Tasmania. At the present time it carries a population of some 150,000 only, but do not forget that this population is 98 per cent. white. And it is the largest community of whites permanently settled in any tropical part of the world. It behoves us as North Queenslanders to controvert the statement made so often by the ignorant—that the Queensland tropics are not suitable for white men. This opinion is holding back the progress of tropical settlement.

It is rather interesting to try to analyse how this dogma has arisen. Of course, one can well understand the dislike for the tropics of old seafarers, living on salt junk and weevily biscuits, rolling in dead calms in the equatorial belt. Again, when these did make land they too often succumbed to local tropical diseases, being ignorant of how to protect themselves. Then scurvy laid its devastating hand on them, unfortunately for the reputation of the tropics, about five or six weeks after leaving Europe, which just brought their ship into the tropical seas. On his voyage round the world in the "Centurion," Anson lost 481 out of 506 of his crew from scurvy. Following these came the school of arm-chair thinkers who said that, while a white man could manage to exist in the tropics till he reached an age when he could retire to England a decrepit wreck on a pension, no white woman could live for any number of years; and as for children, if they were born they would simply die. In turn, this was followed by the school who admitted that children would survive and live to be adults, but that these latter would be degenerate. When it was eventually pointed out that there were tropically born adults in Queensland who were physically fine specimens, they wisely shook their heads and said, "Wait till the third generation." Well, we have a third generation in tropical Queensland, and even a fourth. A sociological investigation, to which I will refer later, recently carried out by the Tropical Institute, showed no degeneration in these when compared with Southern children. From recent correspondence and scientific literature it would seem that our antagonists have again changed ground, or, rather, they frankly say, "We don't believe you," or "You may be right, but the race will change. It may be healthy, but it won't be the same race." This is rather interesting. Briefly, at the commencement it was prophesied that

we would fail because we lacked adaptability to suit ourselves to our altered environment, whereas now failure is prophesied because we have shown adaptability and are therefore not the same race.

I rather think that some of these theorists are led into error because they do not realise the great adaptability of the human organism, given reasonable encouragement. How often have we seen a Southern tourist wandering on a warm day in Flinders street in a thick tweed suit, trousers, waistcoat, coat lined at the back and padded on the shoulders, and probably a thick woollen singlet and underpants as well! This traveller will no doubt declaim to his Southern friends on the terrific heat of Townsville. What would they think of us in Victoria if we strolled down the "Block" in midwinter in a thin duck suit and accordingly condemned their climate as unfit for the white race?

Then, again, conditions are misrepresented through ignorance or on insufficient grounds. W. M. Hewetson, writing on Tropical Settlement in Rhodesia, dismisses Australia's efforts in the following words:—

"A gentleman of high scientific attainments and well known in Rhodesia wrote to me the other day: 'Last year, starting from Tasmania, I went on a long trip up the east coast of Australia to the extreme north of Queensland' (presumably he means Thursday Island), 'where I stayed some time. The obvious results to-day indicate that in the temperate southern zone the English characteristics remain, while in the tropics the "Dago" or Southern European type is being or has been developed.' "

Of course, this is a prevarication, but still the rest of the world takes it at its face value. The last census showed that of immigrants in Queensland there were over six times as many from the British Isles as from the whole of the rest of Europe, which would include not only Southern European but French, German, Swiss, Austrian, and Scandinavian. At the very most the Italian population of Queensland does not exceed 2 per cent. In tropical Queensland it is hard to say, on the figures I possess, what the percentage of Southern Europeans may be, probably somewhere between 3 and 7 per cent., and this Mr. Hewetson believes to be the predominant type of tropical Queensland.

It is not, however, only the tropics which are defamed in this way. Colder regions of the globe than the temperate zone are also grossly misrepresented. Thus seventy-five years ago a high official told a committee sitting in London that an area of Canada under discussion would never be settled on account of the cold. To-day the city of Winnipeg, with 225,000 people, stands on this spot.

The celebrated scientist, Sir William Crookes, wrote an article in 1880 that the world had come to the limit of its wheat-growing capacity, and that on account of climate the cultivation of wheat could never extend beyond the border into Manitoba. Winnipeg, the centre of the district which Crookes said could not be settled, markets over half the wheat produced in North America. It is the same old story. Even those who should know better fail to take into account the wonderful property man possesses of acclimatisation. It may not be generally known that there are parts of land in the Arctic Circle in both the eastern and western hemispheres, according to Stefanson, where the heat in July rises occasionally to 100 deg. in the shade, and where mosquitoes exist in countless millions. On the other hand, ice is occasionally found during the winter in our tropics in small pools of water—for example, in Herberton.

In tropical Australia we are exceedingly fortunate in that we have no large numbers of natives to do our work for us. This may seem to some a strange statement to make, but it is a sound one from a national standpoint, for two reasons:—

1. It means that we are the permanent inhabitants, that we have to make our homes here, that we have to provide hospitals for our sick, and education facilities for our children. It is the lack of true homes, hospitals, and schools that forms a serious drawback to tropical settlement elsewhere. Where natives exist to do the work the white man is an administrator or overseer, who has no intention of making a permanent home there. Such conditions exist in India and New Guinea, and provide an environment totally different to that found in tropical Australia. In such places the lack of a home, children, and congenial company only too often lead to loosening of the moral fibre, to over indulgence in alcohol, and to neurasthenia. In Australia, where white men have to do the work, they are using the greatest prophylactic against the effect of tropical climate—namely, exercise. It is my belief that if every man and woman in the tropics took suitable exercise there would be a very great drop in tropical morbidity.

2. We are lucky to have no native labourers, because the latter act as the spreaders and reservoirs of tropical disease. It is not possible at the present time to stamp out disease from native villages in countries where tropical argiculture is being carried on. Given unlimited power and unlimited funds it probably would be. Too often the white planter or overseer falls a victim to tropical disease acquired from the natives among whom his vocation compels him to live. We escape this danger in Australia, and to this we

owe our remarkable freedom from tropical disease. We have a little leprosy, a little sprue, and a little malaria. Hookworm is prevalent, but seldom actually in the form of a disease. Filariasis will probably be a problem in the future, though we could completely wipe it out by correct sanitary measures. Dengue is epidemic, but not serious. Here, again, correct sanitary measures would completely free us from this sickness. Dysentery of the tropical type is very rare.

We are so fortunately placed that all, from the scientific point of view, that lies between us and a successful realisation of tropical settlement is the singular fondness of the human race for convention and tradition. No doubt this quality has served a very useful purpose in the past history of the white race, but then no white race in the past has ever made a serious or successful attempt to settle the tropics. The particular points of convention and tradition which need altering from the point of view of tropical hygiene are food, clothing, and housing. As a rule, too much meat and not enough fruit, vegetables, and carbohydrates are eaten. As regards clothing, the position is improving slowly, and perhaps in the course of time more rational fashions will prevail.

Housing is a very difficult problem, and all the more so as building costs are high in the North. I have seen a house in the Queensland tropics, constructed in the early days, which possessed a fireplace in every room. We have progressed a little since that time, and raising the house on piles to allow a free perflation of air under the house is a distinct advance. More investigation, however, is needed into methods of using the solar heat and wind for obtaining a free current of air through the house itself. Then there is great need for improvement in the kitchen. It is a great wonder to me how some Queensland women can spend so many hours in what is often an unceiled, unventilated, corrugated iron kitchenette, probably on the hottest side of the house. In the tropics, for the sake of a woman's health, a kitchen should receive first consideration in designing a home. Consideration should be given to its proximity to the dining-room; a servery window and through-and-through cupboards will prevent needless journeys. The stove recess should be well lighted and ventilated; the kitchen a cheerful colour, with adequate light and equipped with as many labour-saving devices as finances will permit. As you will see later, kitchens in tropical Queensland depart very widely from this standard, and we have urgent need for applying better methods of tropical hygiene in this direction.

Georgas, who was largely responsible for the successful termination of the work of constructing the Panama Canal, makes the following remarks:—"The real scope of tropical sanitation which has been almost entirely developed within the last fifteen or twenty years, I believe, will extend far beyond our work at Panama. Everywhere in the tropics to which the United States has gone in the past fifteen years, it has been shown that the white man can live and exist in good health. This has occurred in the Philippines, in Cuba, and in Panama, but the demonstration has been most prominent and spectacular at Panama, and therefore has attracted there the greatest world-wide attention. Here among our large force of labourers we had for ten years some 10,000 Americans, men, women, and children. Most of these Americans did hard manual labour exposed to the sun, rain, and weather conditions day in and day out, yet during that time their health remained perfectly good—just as good as if they were working at home. The same remarks as to health would apply to the 4,000 men, women, and children who lived at Panama with their husbands and fathers. This condition at Panama, I think, will be generally received as a demonstration that the white man can live and thrive in the tropics. The amount of wealth that can be produced in the tropics for a given amount of labour is so much greater than that which can be produced in the temperate zone by the same amount of labour, that the attraction for the white man to emigrate to the tropics would be very great if it were appreciated that he can be made safe as to his health conditions at a small expense."

Chamberlain is nearly as emphatic as regards the Philippines. He says:—

"1. It seems probable that climate in itself exercises very little, if any, harmful influence on Americans in the Philippines.

2. By far the larger part of the morbidity and mortality in the Philippines is due to nostalgia, isolation, tedium, venereal disease, alcoholic excess, and especially to infection—i.e., parasites.

3. The facts justify the hope that the progress of tropical sanitation may ultimately permit the permanent colonisation of certain parts of the tropics."

An interesting but impromptu experiment took place in tropical settlement under the following circumstances:—

At various dates between 1783 and 1789 there came to Kisar, a small island 30 miles north of Timor, in latitude 8 deg. south, nine men of Dutch origin. These were either soldiers or officials. Of these, five married women of Dutch blood and four married

women more or less tinged with native blood. In 1819 the Dutch decided to withdraw this little garrison. These nine families, however, decided to stay behind. At the time of the Dutch withdrawal the native population was probably about 3,000. A very strange thing then happened: to the disturbed state of civilisation which followed the Napoleonic wars, to the British occupation of Java, and to the lack of good anchorages, we must ascribe the fact that this small community was completely forgotten even by the Dutch themselves. During the eighties of the last century Baron Von Hoevell, then resident at Ambon, became aware of this community, and took a great interest in them. Despite their being marooned amongst so many natives, they had resolutely avoided inter-marriage with them.

The present state of affairs has been summed up by Elkington as follows:—

"1. That nine families of originally North European or mixed North European and native blood have persisted on Kisar for over one hundred years, and have bred to five or six generations. In the case of the Joostensz family, the known date of birth of the eldest Kisar-born child of European blood was 1789. His descendants down to the year 1914 numbered thirty-eight at least, and possibly more. His father, J. W. Joostensz, commandant of Kisar, in 1817, was born at Macassar in 1767, giving an uninterrupted period of tropical residence for his family of 154 years on the paternal side, and at least 135 years on the maternal side.

2. That this has not been accompanied by loss of European characteristics of complexion and features except as a result of admixture with native blood, and that even when so diluted the European physical characteristics still come out strongly in the fifth and sixth generations.

3. That the European's standard of mentality, as shown by reaction to European methods of education, persists in a substantial degree after five or six generations.

4. That these characteristics have survived in spite of environmental conditions and associations lasting over sixty years from 1819 onwards, and probably for some seventy years or more, which are generally supposed to be totally unsuitable for persons of European stock. These conditions have included native standards of food and food supply, endemic malaria, and the psychological effect of what must have been for the earlier generation an acute sense of abandonment by their own race, life under the rule of native chiefs, constant association with a native race of low

mentality, loss of European language and religion, inter-breeding to a high degree, and constant exposure to a tropical climate.

5. That there is nothing in the available history of those people to show that a tropical climate in itself has tended to produce degenerative effects on them, or limit their fertility.

6. That whatever evidence they may have shown of lower physical or mental activity in the past can be fully explained by the environmental conditions of food supply, endemic malaria, and, particularly of associations, aided possibly by the accentuation of stock weakness arising from inter-breeding over several generations.

Hintze, after fifteen years of tropical experience, also combats the opinion that white people cannot do well in the tropics. He states that the men who fail to keep their health are those who do not give up the mode of living they were used to in temperate climates, who do not take enough exercise, or are resourceless people who become homesick. Women in German tropical colonies, he states, stand the climate well. He finds no change in their sexual life. He points out the fact that European women who work the hardest in the tropics are the healthiest, and advises white women in warm climates not to neglect exercise. He states children do very well, though perhaps growth may be rather quick at a certain age, but this rectifies itself. He sees no reason to send them away, except for educational purposes. He refers to Queensland, and also to the island of Saba in the West Indies, settled in 1640, population in 1911 2,387, with an absolutely pure white stock. The women are said to be the most beautiful in the West Indies, and are distinguished by their slimness and healthy appearance. Inter-breeding in one village has caused some insanity. The men are healthy and robust farmers and sailors. He then describes the German colony of Espiritu Santo, in Brazil. It started in 1847 with thirty-eight settlers and their families. It was reinforced in 1857 with 1,000 German and Dutch. There was a severe struggle at first with privation and disease. There are now 17,000 to 18,000 people, all very flourishing. The birth rate is 48 to 70 per thousand, and the death rate 8·0 to 14 per thousand. There has been no inter-marriage with natives.

I might quote many more such communities, but these examples, commenced and carried through at times when tropical sanitation was nil, when the methods by which tropical diseases spread were unknown, and when the many modern inventions which render life in the tropics more bearable, were not available,

should surely fill us with the ambition to succeed in tropical Queensland.

It is not my intention to enter largely into the proofs on which are founded the opinion that the white race can live and thrive in tropical Queensland. My opinion depends to a large extent upon statistics, and these are notoriously dry, but I will briefly indicate the lines of investigation that have been followed. The methods fall naturally into three groups—

1. A study in physiology of tropical residents.
2. Effects of temperature, humidity, &c., on animals.
3. A statistical study of those long resident in the tropics and especially successive generations.

Physiology: A large amount of work has been done on this subject. We are indebted to Breinl, Priestly, and Young, of the Tropical Institute in Townsville, for a considerable part of the evidence accumulated on this subject. Acclimatisation consists in altering the chemistry performed in the human body and the heat regulation of the human body, to altered climatic conditions. We call the chemistry performed by the body the metabolism, and it comprises the breaking up of food, its absorption, its use as a fuel for energy or for replacement of worn-out body cells, the elimination of waste products, either fluids, solids, or gases, and the mechanism by which the blood absorbs oxygen from the air in the lungs and subsequently neutralises it in the body. The heat regulation of the body depends on a number of factors, and is a complex and delicate process. On the one hand we have heat produced in the body by muscular action, by the body chemistry, by the ingestion of hot food and fluids, and by high external temperatures. On the other hand we have heat lost by radiation by the evaporation of sweat, by the heat of the expired air, and by waste solids and fluids excreted from the body.

In the temperate zones heat radiation and convection play an important part in body heat regulation, and perspiration is of less importance; but in the tropics, where we have high external temperatures, heat radiation dwindles in importance, and the heat lost by the evaporation of sweat plays the major role. Thus it is that in tropical climates the fluid excreted through the skin as sweat rises in quantity. To show how efficient is the mechanism of the human body for heat regulation, it may be mentioned that as early as 1775 Blagden and Fordyce showed that if men be subjected to a temperature 30 or 40 deg. above boiling point for fifteen minutes their mouth temperature will not rise above normal,

as long as the air is perfectly dry, although the heat is sufficient to cook a beef-steak. But the position is very different in moist air, for then evaporation from the skin is not so rapid. In still air, with a wet bulb temperature of 88 deg. Fahrenheit, the body temperature rises continuously till death occurs.

Young showed that as regards body temperature in the tropics, work raised the body temperature when the mouth temperature often failed to reveal any change. The more acclimatised the resident, the less is the rise in body temperature and the quicker the fall to normal. Some observers have reported a rise in temperature of about 1 deg. in the mouth temperature of recent arrivals to the tropics. This disappears completely after a year's residence. The respiratory rate is slightly increased according to Plehn, Jousset, and Chamberlain. This increased rate, of course, helps to cool the body by increased loss of water vapour from the lungs. Blood pressure is not altered in the tropics according to Chamberlain. This was confirmed by work by Breinl and Priestley in North Queensland school children.

Condition of the Blood: There are only minor differences in this fluid. Anæmia does not occur except when parasitic or other disease is present. The white cells have a slightly altered ratio according to Chamberlain and Priestley. Radsma, in 1927, using the latest method in D.E.I., found no alteration in blood contents as regards water contents, sugar, nitrogen, &c.

Metabolism or Chemistry of the Body: The evidence accumulated by a number of observers seems to show that no radical change takes place in this process as compared with the temperate zone, and that the body does not use this process to any altered extent as a heat-regulating mechanism. In most newcomers there is an increase and stimulation of digestive functions, but this is generally soon replaced by a lessened desire for animal food.

Effect of Tropical Climate on the Nervous System: The main condition which comes under our notice here is tropical neurasthenia, fortunately very rare in our tropics, but common in India, Africa, and other tropical colonies.

Acton in 1927 stated that it was due to disordered internal secretions, and that the predisposing causes were: (1) Unsuitable clothing; (2) tendency to anæmia from lack of ventilation; (3) poor quality of food; (4) use of spices and too much fat in cooking; (5) unsuitable exercise, to which may be added lack of exercise. It is significant that it occurs most frequently in missionaries and officials working among natives and shut off from companionship with their equals. Such people live under constant

supervision, and every action is commented upon. The mental strain in these circumstances must be very severe. Such cases of neurasthenia as occur in our tropics are most frequent in women, and Cumpston has well described the condition as kitchen neurasthenia. Much could be done to prevent this affliction.

The Generative Function: It has been said that this function is more accentuated in the tropics, and that its abuse is more speedily followed by its loss and by neurasthenia. This is probably more a matter of opportunity than climate. Hill has stated that the fertility of the European women is lessened in the tropics. This is not borne out by Australian figures; quite the reverse. For many years, with but few exceptions, the birth rate in Queensland has been higher than the total Australian birth rate. In tropical areas where the fertility of white women is low, it is more probably due to social environment and unnatural life or to birth control.

It is said that the age of puberty is reached much earlier in the tropics. In a sociological investigation performed by this institute amongst a considerable number of school girls in North Queensland, the average age worked out at 13·9 years, which is not earlier than that found in the southern States. Other variations stated to take place among women in the tropics are more often due to a lazy, inactive, and self-indulgent life, rather than to any climatic factor.

As regards the growth of children, at certain times growth may seem excessive, but this soon rectifies itself. The late Dr. Humphry, who endeared himself to so many in Townsville, said, after thirty-four years' experience in Townsville: "See the North Queensland boys and girls racing their horses over jumps and judge whether they are inferior to the rest of Australia. They can hold their own anywhere. If 100 boys were taken out for a hard week's military manœuvres I believe they would hold their own with any other 100 boys from any part of Australia. Anybody who says the race will not thrive in tropical Australia to my mind is talking rot."

Sundstroem, working at the Tropical Institute, investigated the progress of 100 growing girls, and concluded, if growth and development are significant of suitability of environment, then tropical Townsville was by no means an undesirable locality.

Experiments on Animals: All I propose to say in this subject is that experiments have been made with animals, but the results are so difficult to interpret and the findings so hard to apply with due value to human beings that the value of such work is problematical.

Statistical Study: To my mind this is one of the most important and decisive methods for investigating the possibility of permanent tropical settlement. Of what use is it for persons in Europe, America, and South America to say it is impossible to permanently settle tropical Australia on a white basis, when we, the dwellers in North Queensland, actually know we are doing it? We know that there are over 100,000 white men and women dwelling here, and that third and even fourth generations show no signs of mental or physical degeneration, and that we can hold our own with even the pick of Australia in sport; that our students when they attend Southern universities are not infrequent winners of scholarships and exhibitions against all comers. It may be sheer presumption to live in happiness and contentment, make homes, and have healthy children in spite of scientific theorists, but the stark fact remains, we are doing it.

Unfortunately in the past, owing to the fact that census returns are considered on a State basis, it is difficult, or even impossible, to separate tropical Queensland returns from non-tropical, and it has been the custom in the past to consider the birth and death rates of Queensland as a whole as reflecting to some extent what is going on in the Queensland tropics.

In 1921 Breinl made a careful study of the statistics of Queensland. Unfortunately it was not found possible to divide the State into strictly tropical and non-tropical portions. The divisions that were found possible were three coastal divisions and three inland. The first inland and first coastal were purely tropical; the second inland and second coastal were situated partly in the tropics and partly in the temperate zone, and the third coastal and third inland were situated in the temperate zone. Breinl's conclusion included the following:—

"On the whole the average death rates were practically the same in the northern and southern districts. The average birth rates were practically the same in all coastal districts, but lower in the central and northern inland districts, which fact may find its explanation in the smaller number of women of child-bearing age. The average infantile mortality is lower in the tropical coastal districts than in the coastal districts further south." This statistical inquiry proves that North Queensland did not differ essentially from Southern Queensland, and compared favourably with Victoria and Tasmania.

During the five years up to and including 1926, which are the latest figures available, the Queensland birth rate has been higher in every year than the birth rate for the whole of Australia.

Similarly, in the same years the Queensland death rates have been consistently lower than for Australia as a whole. Again, the infantile death rate for the same period was very much less than for Australia each year during the same period.

During the last six months the Registrar-General has been good enough to separate out the statistics of Queensland towns. This will yield in time information of the greatest value in tropical settlement. Although the figures are as yet low, I believe I should quote them. I have taken the following as representative of tropical towns:—Cairns, Townsville, Charters Towers, Mackay, and Rockhampton, and have compared them with Brisbane. They would probably compare more favourably with some of the Southern cities, but Brisbane will serve my purpose. Firstly, the birth rate is 22 per thousand for the tropics, 18·5 for Brisbane, 22 for the rest of Australia, and 17·8 for England and Wales. The infantile mortality rate for Queensland tropics is 59·1 per thousand. I may say in connection with these figures that it has been raised by a large mortality in some of the smaller towns. Townsville's infantile mortality rate was 45·7 per thousand compared with Brisbane 46·2, Australia 54, England and Wales 70, and Germany 105. Townsville's rate of infant mortality would come third when compared with the countries of the world.

The death rate of tropical Queensland is 9·7 per thousand. Here again the figure has been raised in some of the smaller towns. Townsville's rate is 8·8 per thousand, and Brisbane 8·8. This death rate is only bettered by two countries in the world—New Zealand 8·7, and South Austrtlia 8·7. Australia's rate is 9·4, England and Wales 11·6, Germany 11·9, and France 17·5.

The marriage rate in tropical Queensland towns is 12·4 per thousand, while in Brisbane it is 8·0 per thousand. I realise that these figures only represent a population of some 86,000 for six months and are therefore open to severe criticism, but they do demonstrate the trend of events.

One of the most strenuous opponents of the possibility of white settlement in the tropics is Professor Ellsworth Huntingdon, of America. He has written a number of books, the two most noted of which are "Civilisation and Climate" and "West of the Pacific." In his last work, which he wrote after his visit to Australia in 1923, when attending the Pan-Pacific Congress, his work in Australia was founded on a voyage up the Queensland coast and on data supplied by the Commonwealth Statistician. Professor Huntingdon points out that during the eight years immediately preceding the war the crude death rate in Australia

was lower than in any country in the world except New Zealand, and that the Queensland rate was as low as any State in Australia. He also showed that, when allowance is made for the difference in age distribution, Queensland has still a lower death rate than the healthiest countries in Europe. He says that when the low death rate of Queensland was first brought to his attention he thought that there must be some mistake, but careful inquiry had convinced him that the records were essentially reliable. May I here interpolate that this attitude is quite common in opponents to tropical settlement. When statistics or examples of successful settlement are brought under their notice they ignore or deny them. But Professor Huntingdon has unwisely clearly admitted that the figures are correct, and bases his claims against tropical settlement on his explanation of them. He could only find one explanation for them, and if this be proved false then in reason he should admit that he has been in the wrong, and that tropical settlement is not only a possibility but a success.

Fortunately, Mr. C. H. Wickens, a noted Victorian actuary, and strictly without prejudice, has shown that the explanation of Professor Huntingdon is completely wrong, through making several errors in his manipulation of the figures. Mr. Wickens sums up as follows:—It would appear, in depending on Queensland to help in the establishment of his theory, Professor Huntingdon has put his money on the wrong horse. If his theory be true, there would appear to be some remarkable counterbalancing advantages, geographical, climatic, or otherwise, in the case of Queensland, which must be counted to that State as a most valuable asset. As stated earlier, the immediate object of this paper is not that of proving either the truth or falsity of Professor Huntingdon's general theory, but of showing that available Queensland data really furnish no evidence in its favour under modern conditions. Whether the further extension of white population into the tropical portions of the State will give equally favourable results has yet to be ascertained, but the data available in this connection are of such a nature as to warrant expectation of satisfactory progress.

From medical examinations made for admission to the Citizen Forces, it appears that a substantially smaller proportion of rejections occur in tropical Queensland as compared with non-tropical Queensland. There is no substantial difference as regards senior cadets for rejection in non-tropical and tropical Queensland.

Let us now see what those who really have access to plain figures have to say of the danger to health in tropical Queensland. I refer to the actuaries of large insurance companies. Mr. C. A. Elliott, chief actuary of the A.M.P. Society, as a result of the examination of nearly 5,000 policies issued to adults during the period 1910-19 in Cairns and Townsville, arrived at the following conclusions:—"The rates of mortality disclosed from the inquiry were surprisingly low; the actual deaths for the period reviewed were 68, while the number of deaths expected from A.M.P. experience, 1849-1903, was for whole life policies 88 or endowment 81. I have no hesitation in saying that so far as we know at present there is no need for life assurance officers to treat proponents who live in North Queensland different from proponents who live in other parts of Australia.

In the medical inspection in schools by Dr. McDonald, the conclusion was reached that there was practically no difference between the proportion of defects found in North Queensland and that found in the South. Any apparent deficiency in weight was accounted for in the difference of the clothing worn.

In order to obtain first-hand information as to effects and results of tropical residents in North Queensland, an investigation was undertaken during 1924 by the Commonwealth Department of Health. It was designed to cover European colonists of the first generation, viz., immigrants from non-tropical Australia or elsewhere, and the second and later generations. It also included an investigation of sociological and environmental conditions. A fair sample was taken of the population in each area, and the three areas of tropical Queensland were investigated, namely, the coastal area, the plateau area, and the inland plains. As regard children of successive generations their physical and mental standards were in every way satisfactory. The Townsville children at almost every age and of both sexes were lighter by several pounds than the children of other towns. This was almost certainly due to the fact that they were weighed immediately after the hot season. The height at all ages and in both sexes varied from one to three inches above normal in all towns except Charters Towers, where the height was about normal or an inch or two below. When it came to sociological conditions and sanitation, on which the happiness and welfare of the white woman in the tropics so much depend, the situation was most unsatisfactory. Let me only quote the results in Townsville, which I hope will be chosen as not the least enlightened city in the area surveyed. Over 50 per cent. of the houses had the kitchen on the hot side of the house. Seventy per cent. of the kitchens were badly ventilated, and only 15 per cent. of the kitchens were ceiled. Thirty-three per cent. had no water

laid on, the nearest supply being commonly situated in the bathroom, or outside the kitchen door at least 6 to 12 ft. away. As regards lighting, 35 per cent. were supplied with gas, and 3 per cent. with electric light. The majority were using kerosene lamps and wood stoves for cooking. About 7 per cent. had no bathroom or bath, 16 per cent. had the bathroom down the steps or stairs, 30 per cent. had no ice-chest, 40 per cent. were without meat-safes, and 37 per cent. had no dresser in the kitchen. Very few labour-saving devices were noticeable in any of the homes. Fifty per cent. had insanitary backyards, and in many cases fowls and goats ran beneath the house. Ninety-eight per cent. had no proper drainage system in the yard, and 55 per cent. had no tanks. Only 2 per cent. of the cottages were built of iron. This is a dismal picture, but there is hope in the future. The various women's associations are now exerting themselves in the direction of making easier the lot of the housewife in the tropics. Let us hope it will not be very long before public opinion will have reached a stage when a hygienic and labour-saving kitchen will be considered the most important part of the house, as in it centres not only the wife's health but the husband's comfort.

I feel I have delayed you long and I will end by quoting the resolution passed by the Australian Medical Conference at Brisbane in 1920. It sums up the position very well and expresses far better than I can my own views on the subject of tropical settlement.

The resolution was as follows:—"After due consideration of these, and other sources of information embodying the results of long and varied professional experience and observation in the Australian tropics, Congress is unable to find anything pointing to the existence of inherent or insuperable obstacles in the way of the permanent occupation of tropical Australia by a healthy indigenous white race. It is considered that the whole question of successful development and settlement of tropical Australia by white races is fundamentally a question of applied public health in the modern sense, such as has been demonstrated and practised with success amongst civil populations under far more difficult conditions by the American authorities in the Philippines, prior to the Great War, and throughout the military forces of every allied power during that war. It is considered that the absence of semi-civilised people in Northern Australia simplifies the problem very greatly, but it is desired to emphasise in the strongest manner that any considerable extension of population and settlement under the existing loose conditions of sanitary administration and sanitary practice which prevail at the present time in tropical Australia cannot hope for lasting success, and cannot fail to result in ultimate disaster."

THE NORTHERN TERRITORY, GEOGRAPHIC AND ECONOMIC, AND ITS RELATION TO THE COMMERCE OF QUEENSLAND.*

By W. Wynn Williams, F.R.G.S., late Deputy Chairman, Northern Territory Land Board.

Mr. Chairman, Dr. Thomson, Ladies and Gentlemen,—

A question we have heard much about of late is the populating of our empty spaces, and we have been warned repeatedly that, unless we can solve this problem in a comparatively short time, some calamity will surely overtake us.

It was in this city, the Prime Minister (Mr. Bruce) said that, unless we were prepared to move forward at a pace never before contemplated in our history, we would be faced with a situation which would make all good Australians shudder. He said he was not an alarmist, he was merely stating facts.

When we hear remarks such as these from such a responsible source, we indulge in some anxious speculation upon the emptiness of our tropic lands and their proximity to the hungry millions of the East. We think of the declining birth rate of the European nations and the extraordinary virility of the Eastern peoples; and we are told by statesmen and others that, unless we can succeed in solving this problem of population while there is yet time, nothing can stem the flood of an Asiatic penetration.

We are reading repeatedly in our press most satisfactory accounts of the vast potential wealth of what we have reason to believe are our most forbidding areas; and if we believe these reports to be entirely true, then we are compelled to admit that we have failed in our stewardship as executors of an almost unbounded heritage. But when we pause to consider that the population of nearly all our tropic outposts has decreased steadily during the past two decades, there must rest in the public mind a suspicion that these reports are not entirely true, and if this surmise be correct, then are we not actually courting danger by broadcasting these exaggerated accounts of resources which may not exist?

How often do we hear the remarks, "We have no tropics!" and "We have no deserts!" We read the most satisfying statistics

* Lantern lecture to the R.G.S.A., Brisbane, 26th September, 1928.

of the abnormally low death rate of even our hottest localities—statistics which, in themselves, are almost valueless as data for deduction during such an initial stage of settlement. We read of the demise of the oldest resident at a ripe old age, which is urged upon us as conclusive proof of the ability of a tropic climate to foster our race; and recently the Sydney "Bulletin" published the remark that the state of stagnation existing in North Australia was not due to any lack of natural resources, but to the "cold feet" of the South.

The great benefit of this admirable society, of which I am honoured in having been a member for many years, is that it affords an opportunity to the student of our national problems to express his opinion entirely apart from party feeling and bias; and in honouring the trust conferred upon him, he must do so only in the conviction that his investigations and deductions have led him to what he honestly believes to be the truth.

But the truth is an elusive thing; and as our geographic knowledge is seldom complete, our scientific deductions may not be infallible; but we must bear the fact in mind that there are other localities on this earth with the identical conditions of rainfall, climate, and soil as we possess in Australia—localities which have been exploited and populated for centuries, the experience of which it would be ridiculous to ignore. The scientific geographist has collected data the world over for us to read and digest, and to apply to our own problems of development.

As an interesting and valuable expression of opinion upon Australian outpost development, I will quote a paragraph from that great work entitled "Environment and Race," by Dr. Griffith Taylor. He states in his concluding remarks upon Australian development: "We must break up the large alienated holdings and the small ones, too, if they are not utilised for the common good. Let us leave the empty spaces to the pastoralist, for whom nature meant them. Their development will proceed along different lines from those leading to close settlement. It is the same in Australia as everywhere else, the manufacturer and the farmer who will determine the dense population. My earnest counsel to those who ponder this problem during this time of financial stress is that we should tackle the arid lands and the tropics later—much later, and leave the desert to its loneliness."

Therefore, in the mind of that great scientist and thinker, we are courting no danger in the emptiness of our tropic lands.

As a somewhat contra opinion, I will quote the remarks of the North Australia Commission:—

"The Commission deems it necessary to point out that, out of

160,860 square miles of country held under pastoral lease and license, 76,626 square miles, practically half, is held by only six lessees. The area so held equals one quarter of the whole area of North Australia.

"The reason that North Australia is not more developed than it is to-day is not due to natural resources. . . .

"It is regrettable that people, many of whom are not competent to express an opinion, should decry the heritage which exists in North Australia.

"It needs to be stressed that, if North Australia were composed of inferior pastoral lands, it is incumbent that they be settled and developed if the opportunity is not to remain for some other nation to establish itself in Australia."

Therefore, in the minds of the North Australia Commission there are nations willing and anxious to avail themselves of opportunities we are apparently willing to neglect.

To-night I will attempt to trace the history of the Northern Territory from its discovery to the present day, so that you may gather from the experience of the past something of what the future might hold.

Historical Sketch.

When the Dutch discovered the North Coast of Australia early in the 17th century, commerce and not colonisation being with them the main incentive to adventure, the forbidding coast-line and an unattractive seaboard inhabited by a very primitive and treacherous people, possessing no articles of trade, resulted apparently in no attempt at annexation. But a hundred years later, British merchants engaged in the spice trade of the Indian Archipelago, desiring an independent base for their operations, petitioned for the opening of a port on the North Coast of Australia. This led to the opening of a settlement on Melville Island in 1814. The history of this settlement, which lasted only four years, is one of privation and disease and the hostility of a warlike tribe of natives which resemble the inhabitants of New Guinea. The settlement was removed to Raffles Bay in the Coburg Peninsula, and was abandoned two years later as having served no useful purpose. Seven years later interest revived in Northern Australia on the spread of a rumour that the French were preparing an expedition to annex the North Australian coast. This led to the immediate despatch of two boats from Plymouth, and a settlement was founded at Port Essington, the French arriving shortly afterwards to find themselves forestalled. Although a great future was predicted for this settlement, the attempt at colonisation was

a failure, and the community settled down to the uneventful career of an isolated and unfrequented naval base. In 1831 the settlement was abandoned, having been in existence for eleven years.

No further attempts at colonisation resulted from maritime energies, but the discovery of large tracts of rich pastoral land in the interior eventually led to the apportionment of Northern Australia between the States of Queensland, Western Australia, and South Australia, the last-mentioned State annexing what became known as the Northern Territory of South Australia.

The South Australian Government commenced upon the development of its new possession with great enthusiasm, and offered to the public a number of town lots, each lot representing the privilege of acquiring a country selection. All the lots which were not purchased by the general public were acquired by large land companies operating in England and the Colonies. A boat containing the necessary officers and surveyors was despatched from Adelaide to find a suitable site for the new tropic township which was cited in Adams Bay. The history of this short-lived settlement is one of privation and revolt resulting in six of the settlers seizing the only available craft and sailing with it to Adelaide to report upon the unsuitability of the site and the failure of the administration. Some time later the site where Darwin now stands was chosen by Surveyor-General Gonder, who surveyed the town lots and the country selections which were offered to their owners. The land companies refused to accept their land on the plea of delay and a broken contract. Litigation followed which eventually reached the Privy Council, and the South Australian Government was compelled to refund the moneys, together with interest amounting to £73,000.

Nothing daunted by this attempt to colonise its supposed tropic El Dorado, the South Australian Government seized the opportunity of the oversea cable being brought to Darwin, instead of to Burketown as was originally intended. In order to do this the Government was compelled to build a telegraph line from Darwin to Adelaide, the construction of which is undoubtedly one of the greatest epics in the history of Australian development. Thirty-seven thousand telegraph poles were transported over that vast interior. Wooden poles (where procurable) were in some instances hauled a distance of 300 miles. The iron poles, which were in the majority, were transported an average distance of 400 miles. Telegraph stations had to be built, food supplies had to be maintained in a country destitute of natural food, and water supplies discovered in the arid wilderness. In one year and eleven

months, 2,000 miles of telegraph lines were completed and the North Coast of Australia connected with the South. This active telegraph line stands to-day as a monument to enterprising courage and resource.

Mining.

It is reported that the sinking of a hole for a telegraph post in the hinterland of Darwin resulted in the discovery of gold during the year of 1872. In less than two years over fifty mining syndicates were operating on gold leases mainly in the Pine Creek district, 150 miles inland from Darwin. White labour was difficult to obtain for working the mines, so two years after the discovery we find the residents of the goldfields petitioning for the importation of Chinese coolie labour. The request was granted, and the Chinese commenced to arrive; and in most instances the mines were handed over to the Chinese on the tribute or share system, a system which, unless conducted by intelligent labour, has invariably resulted in the abandonment of mines and mineral fields without any methodical attempt to test their value. A study of the early records of these mining fields leaves no doubt upon the methods of the Chinese miners. In almost every instance where the reefs were unable to yield an immediate profit, when the pig-rooting workings fell in, and where any engineering difficulties intervened, the mines were abandoned in favour of other surface shows, which appeared to be easily procurable.

The wealth of these goldfields eventually attracted the company promoter, and in 1896 the Northern Territory Goldfields Company, Limited, was floated in England by Mr. Horatio Bottomley, when this company and its subsidiary companies acquired nearly all the payable gold mines in the Pine Creek area. A vast sum of money was expended in buildings and in plant, much of which was useless for the purpose intended, and large pumping plants were brought to the mines and were never installed. The companies wasted their money without in any one instance having tested the mines below the shallow-water level.

A report of 1886 states: "Not 25 per cent. of the mines have been fairly tested." A report of 1890 states: "There are millions of tons of stone that would yield 8 to 10 dwt. to the ton"; and a report of 1900 deals with 147 gold-mines, sixteen tin-mines, eight silver-mines, and six copper-mines; a great number of which appearing to have been of surprising richness.

The remarks of the Government Resident of the Northern Territory during the latter period of the operation of the large mining companies make interesting reading. He states: "Like many other companies similarly floated, it would appear that

making proper provision for the necessary capital for working the mines was of secondary importance as long as the promoters realised a large sum of money, which in this instance they undoubtedly did. But I consider that in none of the mines referred to has any attempt been made to develop them at the lower levels in order to test their value. It may be mentioned that, prior to the acquisition of these mines by the Northern Territory Goldfields Company, they were being profitably worked by Chinese, and the return from them helped to swell considerably our yearly output of gold."

The spirit of the gold-mining industry was broken. The Chinese commenced to forsake the field, and the gold yield declined until to-day in North Australia it is practically nil.

As the gold yield declined the production of base metals increased, particularly tin; but labour was becoming more and more difficult to obtain, and the mining industry is entirely dependent to-day upon an inadequate supply of suitable white labour. A few mines are still operating with aged and decrepit Chinese, but the only mining operations of any magnitude in North Australia to-day are upon the Marranboy tin-field, situated 250 miles inland from Darwin. The gold and mineral fields of North Australia are scattered over a very large area—in fact, almost along its entire breadth—and as the mining population does not seem to have exceeded 100 white men during the period of the early mining activity, we can form little conception of what the mineral wealth of North Australia may be. This unexploited wealth may in itself constitute a national danger.

Agriculture.

But mines are but transitory things and play but a small part in the permanent development of a nation. The basis of population is agriculture, and the following extract from a report upon the agricultural experiments at Port Essington throws some light upon the early experiences of agricultural development: "We soon found, however, that the rules by which soils are tested in the temperate climates are not applicable here, heat and moisture having so great an influence on tropical vegetation, that descriptions of soil, which according to recognised principles should have been of inferior quality, often proved to be the most productive."

The truth of this remark has been borne out by latter-day experience, and is explained by the nature of the country and the rainfall. The coastal area of North Australia for about 200 miles inland is mainly a sandstone belt, consisting of rugged sandstone ranges, elevated plateaus of barren soil, and a low-lying flooded

coastline. The rainfall is confined to the period between November and April, when the annual mean at Darwin registers 65 inches. These torrential rains have swept a light sandy drift upon the banks of watercourses and depressions, but upon the lower reaches of the rivers, where heavier soils have been deposited, the country is either unapproachable during the rainy season or is too badly drained to cultivate. Therefore, the only success achieved in agriculture has been upon the narrow banks of rivers which are reasonably safe from inundation, and upon the sandy drifts or sand ridges. This northern coastal area contains only a few isolated patches of scrub land, and no extensive alluvial basins capable of intense irrigation.

During the early period of Chinese immigration, the opportunity was taken of the cheap labour to open plantations of coffee, sugar-cane, and rice, but all these undertakings were abandoned; and the South Australian Government, attributing the failure of colonisation to lack of communication with the populated centres, embarked upon another ambitious project in attempting to connect Darwin with Adelaide by railway. When this railway had reached Pine Creek in the north and Oodnadatta in the south, the undertaking was abandoned on account of the strain on the public exchequer. From this time onward the small settlements of Darwin and its mineral fields appear to have lived a contented existence under the careful and capable administration of the South Australian Government. The cost of living was low, and Chinese servants were plentiful and cheap. There appears to have been no unemployment, and the polyglot population of Darwin earned an industrious livelihood.

In 1911 the Northern Territory of South Australia was purchased by the Commonwealth Government, which embarked upon an extensive policy of development in the following year. Two large experimental farms were formed in the hinterland, one at Bachelor and the other at the Daly River. A sheep station was formed at Mataranka, about 300 miles inland from Darwin, and a large dairying farm was established in Western Arnhem Land. The residents were encouraged to become farmers, and land, stock, and implements were supplied to them on the alluvial banks of the Daly River. Vestey Bros. discovered in North Australia a new field for expansion, purchasing a chain of cattle stations extending from the seaboard to 400 miles inland; and erected meatworks in Darwin at a cost of about £1,000,000.

The meatworks operated for three fitful seasons and closed ostensibly for labour troubles. The experimental farms succeeded in proving that nothing could be grown on a commercial basis by

white farmers. The sheep station and the dairy farm proved a failure, and the climax of the attempt of development was reached in 1919, when the Administrator was compelled to leave his territory, and two high officials were deported by the mob.

During this period and to the present day, the cost of living became high. The Chinese became more and more independent, many of them becoming opulent upon the salaries of the increasing number of civil servants. Unemployment became rife, and the tone of the settlement has become one of rankling discontent and a mistrust of all authority.

With the exception of about 7,000 buffalo hides (10,000 during last year) and a live-stock trade to Manilla of about 7,000 cattle, about 20 tons of peanuts, and a small quantity of tin concentrates from the Marranboy tin-field, Darwin possesses no other exports of any consequence; therefore, it is difficult to maintain in employment the few labourers who do not wish to migrate from the town. But the spirit of unrest is accentuated by unaccustomed restrictions, and by the absence of a tangible and sympathetic form of government.

I feel that if the people of Darwin (few though they be) were governed by officials experienced in outpost settlement, and were afforded a greater measure of confidence by the authorities, so that they might realise a fuller responsibility to the State—I am sure such confidence would not be misplaced, and the result would be highly beneficial in inculcating a more favourable impression of our colonisation in the minds of our Eastern neighbours.

Climate.

The climate of the northern portion of the Northern Territory is exceedingly hot, Darwin possessing the same homoclines as Lagos. As to whether a white race can thrive under these tropic conditions is an open question, but those of us who have lived in the tropics for long periods are the best judges of our own mental and physical efficiency under the climatic strain as compared with the colder localities. The mental and physical deterioration which is claimed to exist in some instances in our tropic outposts may be due, in a measure, to a state of mentality occasioned by industrial inertia and depression; because we have evidence of industrial activity and progress overcoming—temporarily, at any rate—a climatic disability; nevertheless, while there are some of us who elect to live in the tropics and claim no ill effects, there are others who are unable to do so and still retain their efficiency and health.

I believe there is no part of this globe that our own race will not develop and populate providing the return be commensurate

with the risk and the discomfort entailed; but why should we encourage our people to populate that northern coastal area which offers nothing but hard work, discomfort, a miserable standard of living, and in all probability tropical disease?

Desert Lands.

The rainfall of 65 inches at Darwin gradually diminishes until its annual mean is less than 6 inches on the southern boundary of the Northern Territory; thus the southern half of the Territory is placed in the scientific category of Desert. This desert belt consists mainly of wooded sand, except where broken by mountain ranges and hills. Approximately one quarter of this arid country is held by pastoralists under lease and license, some of the country so held being capable of producing wool with great success. The carrying capacity of the country is low, but water supplies sufficient for the carrying capacity of the country can be expected at shallow depths. Most of the desert is coated with spinifex, which is an excellent safeguard against drought; but it remains to be proved whether any of the Central Australian Desert contains spinifex of such a nature as to maintain a flock of sheep without the aid of other fodders. Our geographic knowledge of this desert area is much too limited to form any opinion of what the wool production of Central Australia is likely to be, but some flocks of sheep are being carried in the MacDonnell Ranges with success, and there are many unstocked areas in that region capable of carrying flocks of sheep. The most productive area of this desert land appears to be situated amid the eastern foothills of the MacDonnell Ranges extending to the Queensland border.

The Prairie Lands.

An extensive belt of Mitchell grass prairie land commences in North Australia, near Newcastle Waters (about 480 miles inland from Darwin), and stretches in a south-easterly direction into Queensland, where it is separated from the prairies of North and Central Queensland by the Argylla and Selwyn Ranges, which comprise one of the greatest mineral areas of Australia. This belt of prairie land comprises within the Northern Territory an area of approximately 30,000 square miles, and it is capable of depasturing (at a very conservative estimate) at least 3,000,000 sheep. The Great Northern Railway extending westward from the port of Townsville reaches within a short distance of the edge of the Queensland quota of the Barkly Tableland. This means of transport, together with an active land developmental policy, has resulted in the appreciable production of the small area of the

prairie within Queensland of approximately £108,000 per annum in cattle and wool; an equal area of the heaviest stocked land within the Northern Territory only amounting to £24,000. This very marked difference in production is not entirely due to the lack of transport facilities, but to the locking-up of the land in excessively large areas, leased at very low rentals, and provided with no satisfactory covenants to ensure development.

By apportioning a State among a few individuals, we effectively close its development against many avenues of capital. The first consideration of leasing land should be a guarantee of its utilisation and improvement, and any neglect of making proper provision for such has resulted invariably in a form of settlement detrimental to the public interest. The policy of the Queensland Lands Administration is to encourage the production of wool-growing in its outposts by extending the leases of the holdings, and by imposing rigid conditions of improving the land, which the lessees are apparently quite willing to undertake.

Nearly the whole of the Barkly Tableland prairie is held by Queensland lessees or by pastoral companies operating in Queensland, and a glance at an economic map of the Northern Territory illustrates the cheapest and most effective method of developing that area, which is by extending the Great Northern Railway through the prairie into the Northern Territory. Trade will naturally trend towards the populated localities unless some appreciable advantage can be gained by going elsewhere, and it is a foregone conclusion that the trade of the Barkly Tableland will continue with Queensland, and the same remark applies to much of the rich desert sheep land situated between the Queensland border and Alice Springs. A great increase in production of wool would be realised by the extension of the Great Northern Railway a further 100 miles, and by an extension of 300 miles an increased production amounting to £2,500,000 per annum could be anticipated.

Conclusion.

From the standpoint of production of fine wool the prairie lands and even the deserts of the Northern Territory are worthy of much closer attention than they have received hitherto, but this class of land is not capable of supporting a large population.

The intermediate belt of country separating the tropic coastal region from the steppe land is a sound cattle-breeding area, and is capable of supporting large herds. Buffalo and zebu, and even the crossbred zebu, thrive and multiply without attention in the coastal

areas, but the zebu strains are wild in nature and difficult to handle on open range, and while the success of our oversea trade depends upon a high quality of meat, the introduction of the zebu into the herds of European cattle is a hazardous undertaking.

The only prospect of maintaining a population of any consequence in any part of the Northern Territory lies in the development of its mineral wealth, which may induce a temporary agricultural settlement of a kind, but permanent settlement can only be fostered along pastoral lines, for which there is an extensive scope, particularly in the profitable industry of fine wool.

The coastal area of the Northern Territory is well supplied with small and moderate-sized streams and numerous lagoons; and, in spite of the poor impression I have conveyed of its agricultural possibilities, it is only reasonable to presume that there must be in the aggregate quite a large area of irrigable land, which will some day support a population of a kind. But the geographist tells us that in no part of the world, under the same conditions of rainfall and climate, has any country unprovided with large alluvial basins capable of intense irrigation been able to maintain an agricultural population of any magnitude. We can see no prospect in the near future of populating that tropic area to an extent to become a factor in its defence, and in my humble opinion I doubt if any nation in the world is anxious to populate it. The envious eyes of the over-populated nations will not be directed towards our northern seaboard but upon the eastern and south-eastern fringe, which is capable of supporting a dense population.

I have no desire to decry any heritage we possess, but the claim of a very small community like our own to such a large area of land will be disputed in no uncertain manner if we persist in claiming, for our most forbidding areas, vast potentialities of wealth which our economic conditions will not allow us to exploit. I therefore feel that I will have achieved some useful purpose in assisting to dispel the delusion that those Northern tropic areas are capable of maintaining a population of any magnitude of any class, because the very vexed question of where the over-populated nations are to be allowed to expand must be considered in the near future; and we may be compelled to give an account of our stewardship before the tribunal of the League of Nations.

THE INFLUENCE OF GEOGRAPHY ON WAR.*

By Brigadier-General C. H. Foott, C.B., C.M.G., A.D.C.

1. War may be studied under three heads. Beginning from the lowest, and proceeding upwards, these are—

Tactics;
Strategy;
Nationalism or Patriotism.

"Tactics" may be roughly defined as "The art of using, to the best advantage, the forces available in the terrain chosen by (or imposed upon) the local commander."

"Strategy" is the art of bringing the enemy to battle. It is to be noted that the essence of Strategy is "to *bring* the enemy to battle"—not to let him bring you to it.

One is irresistibly reminded of the old *chanson des enfants*, "Dilly, Dilly, come and be killed." "Nationalism or Patriotism" may be described as "The Will to War."

Further to illustrate the meaning of the three terms, one might say that Tactics must be studied by all ranks up to that of the divisional commander.

Strategy must be studied by the corps and army commander, and should be studied by leaders of the nation.

Nationalism—I can find no better word—should be studied by all thinking people.

2. In all these three phases of war, geography plays a most important part.

Taking Tactics, in smallest sense first, the corporal or oldest soldier, in charge of a section of infantry (= from 8 to 12 men) studies geography, in its smallest sense, as an aid to the tactical handling of his section. He sees in front of him a ditch, or a bank, or a hedge—a geographical feature—and, realising that it will give shelter to his section, he directs them on to it. There is a seemingly small instance of the influence of geography on war. It only *seems* small; it may be of vast importance.

Look at two instances of the importance of small geographical features—the "sunken road" to Ohain, which cost Napoleon a

* Lecture to the R.G.S.A., Brisbane, 28th November, 1928.

regiment of cavalry, and the hopfields at Woerth, which again cost the French a mass of cavalry. To come nearer home, nearer to to-day, look at the narrow beach at Gallipoli, with its near-by, steep-sided gullies, without the shelter of which we could not have lived for those eight weary months.

3. From a strategic point of view, geography naturally plays an increasedly important part in the conduct of war. The corporal, leading his section in the defence or attack on a river crossing, is interested, for example, only in a small fissure almost parallel to the main stream. The army commander is interested in the fact that the river is an obstacle which will delay or prevent the advance of the enemy or of his own troops. The statesman is interested only in the fact that the crossing of the river constitutes either an act of aggression by the enemy, or "a glorious achievement by our gallant troops," as the case may be. But they are, all three, interested in geographical problems of varying degree.

4. From a national viewpoint, the crossing of the river may be of varying interest and significance, apart from any purely military aspect. National pride and sentiment, trade, or domestic peace may be affected.

5. Turning now to the influence of geography on major military operations, four great highways and theatres of war disclose themselves. First is the great avenue of conquest from Eastern Europe to India, through Asia Minor, Teheran, Seistan, Kabul, and thence across the Hindu Khush. Alexander, Tamerlane, and Julian the Apostate used this route, and to-day it is still a possible avenue of approach to India.

Another route of great strategic importance is that from the mouth of the Nile, along the eastern littoral of the Mediterranean; it ran from Cairo through Belbeis, Salahieh, Pelusium, and thence along the coast through Gaza, Jaffa, Acre, to Beirout.

For the invasion of Egypt, and the capture of Cairo, the key to the Delta, the route from Pelusium has always been used. It was so used by Cambyses, Alexander the Great, Amru, and Selim I. There is another possible route, that from Alexandria along the western side of the Delta, *via* Damanhour and Ghizeh. Napoleon Bonaparte used this route in 1798, but it has the drawbacks that its first two or three stages are through desert, and that it brings the invader opposite to Cairo, with the Nile still interposed between him and his goal. The crossing of the main stream in face of the enemy, when the army has pushed so far inland, might prove very perilous.

To start from Damietta with a view to marching on Cairo is strategically unsound, because of the geographical features of the Delta. In 1220 John of Brienne attempted this enterprise, and, as you know, failed dismally. The progress of his troops was impeded by the canals, and the rising of the Nile sealed their fate. Seven centuries afterwards the same geographical features rendered military operations in the Delta a most difficult matter.

Northward from Pelusium runs the route already mentioned. A veritable "Soldiers' Way" for many centuries, it has last been used by the British and Australian troops marching to the conquest of Palestine.

The name "Qatia" is familiar to us. It is the comparative of the Arabic "Q'ies—plenty"—meaning "more than plenty" (of oases). It is impossible for me to say when the first military expedition marched along this route, but I do know that the Crusaders in fortifying Ascalon used as tie-rods for the walls granite pillars of a much earlier date. For this information I am indebted to my friend General William Grant, of Dalby.

May I be pardoned for this long digression. It is due to the fact that the troops of the youngest nation in the world have been constrained by geographical considerations to follow a well-beaten track.

Next comes the Ægean Sea, in which we fought the great naval battles of the past; and lastly come Belgium and Flanders, where for 2,000 years have been fought the battles that decided the mastery of Europe. The Dodecanese Group, on eastern side of Ægean Sea, is another important strategical area.

6. Let us now consider the question of strategic points—places for which nations have fought, and on which vast sums have been spent in strengthening them against attack. It must first be pointed out that no nation can become a real world power unless it can command the sea, or at least exercise some control over the sea.

Britain, for example, was a world power long before she became the vast empire that she now is, and this because she could exert a great influence upon the sea-borne commerce of the other Western European powers. Her strategical position on the West Coast of Europe gave her the opportunity to control the traffic from the Americans to Spain, and it was only by becoming a sea power that she could make use of this opportunity. Russia, although a power in Europe, was never a real world power, since her geographical conditions precluded her from ever becoming a naval power. Germany, powerful on land, realised that, to gain her "place in

the sun," she had first to gain a place on the high seas. Here I would like to call attention to an article in the September 1928 number of the National Review embodying a memorandum by Sir Eyre Crowe. Pages 50-51 show the relation between geography and world power, and the strategical coefficient involved. The United States, once content to occupy a position of splendid isolation, has now become a world power by virtue of her naval strength. The need for naval strength arose out of acquisition of overseas colonies, and these in turn afforded sites for the naval bases required overseas to maintain her sea power.

7. And it is as essential parts of the naval strength of a nation that we must regard those nodal points for many of which great battles have been fought, while some have been acquired by purchase or by colonisation. For without these nodal points to serve as bases for her fleets a power cannot control the seas for any great distance beyond her home ports.

Gibraltar, it has been said, "commands the Straits." It does nothing of the sort by virtue of its armament. Although to-day, perhaps, the guns there may have a range that would enable them to bombard Ceuta, this was not the case when we fought to maintain it in our possession. Its value lay then, as now, in the fact that it was and is a base for our fleets in the Mediterranean and the Eastern Atlantic.

Similarly, our possession of Capetown gave us a naval base from which our fleets controlled the vast trade from the East Indies and India. The French lost India at sea, not on land, and our hold on the West Indian Islands was the principal reason for the decline of the Spanish power at sea.

8. History gives us many examples of bad appreciation by rulers and statesmen of the value or otherwise of certain geographical features. When the English kings lost their hold on France, it was, I submit, unwise to spend time, money, and blood on the effort to retain Calais. The geographical position of England gave them control of the Channel, and, as already stated, control also of the Western trade routes. Why worry about a seaport on the other side of the Channel, which could be neutralised by Dover and Portsmouth? The cession of Heligoland to Germany was an error which cost us dear. Not that Heligoland was of any real strategic value to Britain, but because it was of enormous value to Germany when she became a naval power.

9. Much has been said and written about Britain's hold on Egypt. While all recognise the absolute necessity to the Empire

of the Suez Canal, all do not recognise that naval power alone will not enable us to retain the canal. While Britain holds Aden, Malta, and Gibraltar, other nations can be denied the use of that route, but the power that holds Lower Egypt holds the key to the East. This is as true now as it was in Napoleon's day. It is to be noted that, in order to secure the banks of the Panama Canal, the U.S.A. has formed a neutral zone on each side of it.

Among other points of great strategic importance owing to their geographical position are the following:—

Singapore, in that it lies on a great commercial water way, and also because it furnishes a naval base in Far Eastern waters.

Hawaii, by reason of its position in Mid-Pacific. Its possession is essential to the U.S.A. for two obvious reasons.

The Falkland Islands, which, strategically, are to South America what Capetown is to Africa.

10. It will be noted that each of these strategic points lies on or adjacent to some great sea route, which in peace is traversed by commercial vessels, and to which, in war, would be added the fleets of any belligerent power requiring to change their dispositions. For, as Colonel Henderson says, "War is first and foremost a matter of movement. . . . In the second place, war is a matter of supply. . . . General May writes: "Success or failure in war ultimately hinges on communications."

In war, excepting perhaps purely localised land warfare between States having no sea-coasts or no naval strength, the maintenance of the sea-ways is of the most vital importance. Not only may it be necessary to move fleets from sea to sea, but it is essential that those fleets should have harbours where they can replenish stocks of fuel and munitions, where repairs can be effected, and where the personnel can be afforded some measure of relief from their confinement on board ship. But of at least equal importance is the maintenance of the trade of the world. Interruption of the sea-borne trade in foodstuffs has, as we know, the most serious effect on the nation. And it is not practicable to open new routes, to lay down a fresh system of sea-routes; for the great sea-routes of the world are defined and restricted by geographical considerations, and along them has grown up a vast and intricate system of supply and maintenance for the ships that use them—fuelling stations, supply depots, repair shops, and watering places.

The corollary, therefore, is that the existing sea-routes must be protected by naval power, and it is in the location of the necessary overseas bases and fortified harbours for the navy that geography plays so great a part. For it is almost unnecessary to say that, in selecting these places, not only has their position in regard to the trade routes to be considered, but also facts relating to climate, rainfall, winds, tides, and currents, must be known and discussed. All these are geographical matters within the purview of societies such as yours.

11. So much for the major aspect of communications—that of the great sea-routes. Strategy, however, must concern itself also with matters of geography on land, and here again the matter of communications is of great importance.

The practical expression of "space" is "ground" in which, to-day, are to be sought the main obstacles to movement in land warfare.

Ground may be divided into three types—

(*a*) Mountainous;

(*b*) Undulating;

(*c*) Plain lands.

The nature of each of these is normally governed by water. If water be abundant, the following conditions are generally met with:—

(*a*) In mountainous country, swift rivers, unsuitable for communications, and wooded valleys;

(*b*) In undulating country, large rivers, suitable for use as thoroughfares, and towns and scattered villages;

(*c*) In plain lands, an extensive network of rivers, and towns and scattered farmsteads, or few rivers; and, consequently, desert regions.

The causation of the water supply in rivers must also be considered from a geographical standpoint, since that may have a great influence on strategy. Are the rivers replenished by local rainfall or by rainfall in distant mountain ranges, together with (in some cases) the melting of the mountain snows?

Some geographical features can be nothing but a hindrance to movement. Such as these are swamps, cliffs, and deserts. Other features, again, may be a help and not a hindrance. A river, for example, while offering some hindrance to movement *across* it, may

be of great help if its course conforms to the direction of movement, or if, conversely, the direction of movement can be made to conform to the course of the river.

A small example of the two parts that may be played by a river can be drawn from the experiences of the Australian Corps on the Somme in August-September 1918. The upper waters of the Somme flow from south to north until reaching Peronne, where the river turns sharply to the *west,* flowing in that direction to the sea. Fighting eastward up the valley from Amiens, the Somme was a help, since it became a waterway in relief of the congested roads and railways. After the fall of Peronne, however, it ceased to be of use upstream of that city and became in a small degree a hindrance, since it lay across our path. The fighting at Mont St. Quentin, Eterpigny, and St. Christ was due to the *obstacle* presented by the river.

Many leaders have made use of rivers as part of their lines of communication, for it must be remembered that a waterway does not wear out like a road. Frost, drought, and flood may have to be considered, and here the geographer can help the soldier. The Elbe was the main line of communication for Frederick the Great in his wars in Bohemia; Burgoyne used the Hudson towards Albany; the Germans in 1870 used the Rhine, the Federals the Mississippi, and for many years the Nile has been a strategic waterway. In the Great War, the Tigris and Euphrates carried men, stores, and munitions for both the Turks and ourselves.

Apart from its influence as a help or a hindrance, a river may be of great importance as a source of water supply to an army, for the lack of water is fatal to success. Look at the Jordan in our Palestine campaign, and the fight for the Gakdul Wells (1885).

And here let me turn aside to say that the soldier must seek help and guidance from the geographer, or his near brother the geologist, on this vital matter of water supply for his army.

In the Manual of Military Engineering, vol. vi., "Water Supply," there are ten closely printed pages upon "Sources of Supply," dealing with the physical and geological factors affecting water supply.

To illustrate the necessity for a geological study of any area of operations, one can consider the question of water supply for the British armies in France and Belgium during the Great War. On the north, the coastal plains near Ostend and Nieuport are the Polders, just about level with high-water mark. Surface water was plentiful, but usually foul and brackish. In the sand-dunes, a little

water could be obtained from shallow wells, but there was none to be obtained in the marine sands and peats of the Polders. Southwards towards Ypres is found near the surface an impervious blue clay, a Tertiary deposit, similar to the London clay. This meant that only surface water could be obtained, and this was almost invariably bad. The solution of the problem lay in the sterilisation of the lake waters of Zillebeke Lake and Dickebusch Lake, or from the Yser. South again, in Artois and Picardy, comes a chalk formation, in which, at depths up to 300 feet, ample water of excellent quality was available.

All this proves that a knowledge of the geology of any proposed theatre of war is essential, in order that the question of water supply may be properly studied. In addition there are the engineering problems—roads, railways, and deep mining.

12. *Mountains.*—It is easy to place too much reliance on mountain ranges as obstacles to an invader or as protection to a flank. Although the advance in aircraft has enabled the modern Napoleon to "see what is on the other side of that hill," yet a mountain range still offers some hindrance to the physical movement of troops and particularly of transport. But an active and determined force will cross mountains, even in the face of opposition. The Alps were crossed by Hannibal, by Francis I. (1515, at 10,000 feet), by Napoleon; Alexander crossed the Hindu Khush, and the British have entered Tirah and Thibet. Whether a range of mountains is to be successfully used either in defence or in attack depends on the knowledge possessed by the commander. The success of Jackson in the Shenandoah Valley was due in a large measure to his knowledge of the Massanuttons, their passes, defiles, and impenetrable parts.

It is usual to consider mountain ranges as a bar to progress, or at least a hindrance, by reason of their lying transversely to the required line of advance. But ranges running longitudinally, rather than transversely, to the line of advance may be a bar to military operations. It may be necessary to advance in two or more columns, along two or more parallel valleys. If the intervening range or ranges are difficult to cross, then one column cannot support its neighbour, and either is liable to defeat in detail. Here, again, the commander of the force, before splitting it up, must study the geography of the adjacent mountains. The advance of the Prussians against Benedix in 1866 (Königgratz) gives an example of the use of parallel valleys.

13. *Valleys.*—It is necessary only to mention these, to call to mind the fact that their influence on strategy must be of the highest

order. In the valleys run the rivers, alongside the river runs the road or track, and along the same route, frequently the railway line must be laid.

If the soldier will but ask counsel of the geographer, he may learn much about the valley that does not appear on the small-scale map. Does the river rise in flood? At what season? To what extent? What is the nature of the soil? Is it liable to be boggy? Is stone available for roadmaking? (Note that in the Somme campaign every ounce of stone had to be imported, some from the Channel Islands.) Are there forests in the valley? Of what timber? Is it suitable for building or firewood? These are a few of the matters on which the geographer's advice will be sought.

14. *Sea Coasts.*—The geographical features of the coasts are of interest, and they may affect either naval or military strategy, or, more frequently, both. Take, for example, the selection of a site for an overseas base for an expeditionary force operating in hostile country. A force of no great size requires quite a large area adjacent to the place of disembarkation. The terrain of this area must be suitable for the construction of light railways, the storage of commodities, and the encampment of troops and horses, including water supply. In addition, the coast must be suitable for the approach of transports, store ships, and their naval escorts.

It is necessary, therefore, to know much, in detail, about both the land and the sea. It may be necessary to balance one set of conditions against another; e.g. a terrain eminently suitable in all respects for the purpose may have to be ruled out, for the reason that ships cannot approach the shore or maintain station in the vicinity. Winds, tides, currents, and fogs are factors demanding consideration.

Although much information as to the seaward side is available in charts and sailing directions, there is usually but little information regarding the land. As it is improbable that the nation in possession will permit the making of a detailed reconnaissance after diplomatic relations become even strained, it follows that the best source of information is that gained in time of peace by explorers and geographers.

The extraordinary congestion which arose at the overseas base on the Shat-el-Arab, about 15 miles below Basra, is an example of the influence of adverse conditions on the working of a base. Briefly, the main factors were: Lack of wharfage (which could be, and was, ameliorated) and lack of suitable terrain for troops and stores; the surrounding ground was swampy alluvial. Nearly two years elapsed before matters were satisfactorily adjusted.

15. It will be seen that I have touched only on physical features, natural features. Roads, railways, canals, bridges, and tunnels all have to be considered. But the first construction of these, and their maintenance, are so entirely dependent upon the natural conditions that they are secondary and are not primary geographical conditions. Nor have I touched upon three natural features which may affect strategy—deserts, swamps, and forests. The late war gave several examples of the use and the subjugation of these, and modern science has done much to minimise their influence on war. But while they exist, the geographer must help the soldier to deal with them scientifically.

16. It may be of interest to note that many of the foremost explorers and geographers of all nations have been sailors and soldiers. To mention a few names in the history of Australasian exploration we have Cook, Oxley, King, Logan, Mitchell, Lockyer, and Flinders. Sir Lachlan Macquarie instigated and directed exploration, even if he did little actual exploring himself.

17. The joint progress of exploration and strategy may be worth consideration. In many cases, the process commences with the discovery, by the explorer, of some hitherto unknown riches or potentialities in an area. In the description of his travels, the explorer describes the means of access, the climate, meteorology, inhabitants, and resources of the country, or, if these are already known, confirms or adds to that knowledge.

The statesman and the strategist become interested. Here is a new source of supply of some commodity necessary to the human race. If the new-found wealth lies in territory already owned or occupied by a power, it may become necessary to protect it against foreign aggression. If it is owned by another power, how can the transport of those commodities in war be assured, or be hampered, according to the situation? Can the territory be acquired, either by force, if necessary, or by some more reasonable means?

The discovery may be of such a nature that its effect on world politics and on strategy may not at first be apparent. The discovery of an inexhaustible lake in upland territory may not seem to be of great moment. But if the soil of the lowland territory, if irrigated, can produce a commodity—say rubber, sugar, cotton—the commercial world-importance of that hitherto relatively useless territory may immediately alter. The strategical value of the territory alters, and it may well be that fresh consideration must be given to the defence of ports and of the sea or land communications therewith.

To take but one instance of the national, commercial, and military importance of the existence of an essential commodity in an area—the Persian oil-wells. And from that, let us consider the strategical considerations that might be involved in the discovery in large quantities of oil in New Guinea, or of steam-coal in N.W. Australia. And these discoveries, if made, will be made by the explorer, the geographer.

17. In conclusion, may I quote, again from General May, a passage which perhaps should have formed the text for this paper?

> "The influences of geography, direct and indirect, on mankind and the doings of mankind have aroused growing interest; and now everybody recognises that all, or almost all, sciences are in some way or other under obligations to or connected with geography.
>
> "Thus history, botany, zoology, and the art of war, all become closely associated with it."

In his campaign against the Mahrattas in 1803-4, Sir Arthur Wellesley (as he then was) made a careful appreciation of the geographical situation before embarking on the enterprise. He went very thoroughly into the effects of the S.W. monsoon on the country through which he was to operate, on the rivers which crossed his proposed path, and on the crops on which he had to depend for sustenance.

PAPUAN FOLK LEGENDS.

By Leo Austen.

During my sojourn in the northern division of Papua during 1927, I collected the following legends of the tribes of the Buna sub-district, and of the north-eastern slopes of the Hydrographers Range. Both speak dialects of the Binandere language of the Gira and Mamba Rivers, though the Hydrographers dialect, known as Berepo, presents a much greater difference than that of Buna owing to the change in several consonants. Copeland King has shown in his "Grammar of the Binandere Language" (D.S. Ford, Sydney, 1927) that the Binandere P becomes H, D becomes S or J, S becomes H. It is only natural that we should expect to find a greater difference among the Berepo, for being inland peoples they were looked on askance by the ones nearer the coast, who would keep more in contact with the Gira and Mamba tribes, with whom trading and social intercourse was a common occurrence.

My introduction to northern division folklore commenced in rather a strange way. One day, while on patrol among the foothills of the Hydrographers, I was comparing an old map with a more recent one, and on the old map I noticed that Mount Lamington, the northern slopes of which are inhabitated by the Sangara people, was named Berepo. I spoke to my orderly about this name as it was totally unknown to me, and was informed that Berepo was not the name of Mount Lamington, but the name of the language spoken by the Sangara people on its slopes. I was not satisfied with the information, which seemed contradictory to what had apparently been given previously, and further inquiries led to my orderly, who was from the village of Embi, telling me the story of "The Spirit of Embi Lake." This of course threw quite a new light on the subject, and though at present my knowledge of the social organisation of the Binandere tribe is very small, I feel certain that further inquiry into the Berepo tribe will show that the eight groups into which Gogowairo divided the Embi people are

really eight totemic clans. This can be seen from the undermentioned table:—

Name of Group Village.	Ewowo (trans. by C. K. as "totem").
Perohaha	Andaku tree (? Cycas)
Andirihaha	Paingo tree
Kombu (? butcher bird) ..	Inene tree
Onoho	Sinda tree
Umotaha	Umo (= water)
Tirembo (from Tiri = hill, and Embo = man)	Javena (lalang grass)
Dirogu (a species of pigeon) ..	?
Sangara	?

Among the north-eastern foothills of the Hydrographers Range lie four lakes known as Embi, Embohu, Awamba, and Popoha. These lakes, the largest of which is Embi, are surrounded by volcanic hills—the ends of the great spurs from the main range.

One of the hills which overlook Embi and Embohu Lakes was until quite recently the site of a village called Embi. The sides of the hill slope steeply down to the lakes below. The people of Embi, a few years ago, moved down on to savannahs to the north-east of their old site.

For many years now, Embi Lake has been locally famous for its floating islands. These islands are apparently of many thicknesses of matted grass roots, and are covered in high rank lalang. They float slowly over the waters of the lake, moving sometimes to this side, sometimes to that, or even remaining stationary near the centre.

The following is the tradition of Embi Lake as told to me by my orderly and other old men of Embi.

The Spirit of Embi Lake.

Long, long ages ago, a tribe of natives dwelt among the foothills of those mountains now called the Hydrographers by the white men. But no one knows what was their tribal name. In those days, so tradition says, these people were the only natives who were living in the northern division (spoken of as Buna, Kokoda, and Ioma marks). We do not know whence they came. The tribe was there.

One day before the waters of Embi were so extensive, and when only a small creek ran between the hills, a man of this ancestral tribe sallied out to hunt the wild pigs of the forests. In his travels he came to Embi Creek, and was amazed to see that it

was teeming with fish. He hurried back to his village and called to all his people to come in. The tribe assembled in haste, thinking something dreadful had happened, but were delighted to learn that Embi Creek was going to supply them with food for many days to come. Their few treasures were soon packed, and the women went to their gardens and brought in much taro, bananas, and coconuts.

On arriving at the creek, rude shelters were erected, and their food and dillybags placed under them out of reach of the weather. The people then split into small parties to fish with net and spear in various parts of the creek. But while they were fishing a strong wind began to blow, and it blew stronger and stronger until it became a very hurricane. Then the rain fell in torrents. The small creek swelled into a mighty stream and the ground about "turned over," and all the fisher folk were engulfed! (Tradition does not tell us over what period this cataclysm took place.—L.A.)

One small boy and one small girl had stayed behind in the village and did not venture out during this unprecedented storm. But by and by when a calm came the two children followed the tribe down to the creek to look for their people, but no one could they see. The small creek where the villagers had fished was turned into a long lake which seemed very deep.

On the banks where the Embi Creek flowed into the lake, the two children found piles of taro and coconuts and other food, which had been left there by the tribe; but they could descry no sign of any human being. Then they noticed on the lake a strange creature swimming towards them. It was more like a giant turtle, though its back was covered with long grass instead of hair.

"My name is Gogowairo," said the stranger; "what is all this food doing here?"

"It belongs to my people who came down to fish," answered the boy; "Where are they? What is this big water?"

"Ah," replied Gogowairo, "Why did your people come and fish in these waters? They are now all at the bottom of the water."

(Although the raconteurs do not mention it, it is possible that at this point the children would begin to feel lonely and cry.—L.A.)

Gogowairo then said, "Take all this food and put it on my back and I will take you to a good place."

The taro, the coconuts, and the various other fruits were placed on Gogowairo's back, and afterwards some firewood was piled on

top. Even a lighted firestick was not forgotten. When all this had been done the two seated themselves on the heap. The grass-covered creature took them to a place called Embi, on the other side of the lake, and there he spoke to them.

"This is a good place. You cut the tops off the taro and put them in the ground. You put the dried coconuts in the ground. You put this sugar-cane stick in the ground. If you do this you will always have plenty of food. You go to the bush and cut posts. You go to the bush and cut timber. I will show you how to build a house. You go to the sago swamp and cut down a sago-tree. I will show you how to prepare the sago for eating so that you will grow big and strong very quickly."

All these orders and more the children obeyed, and soon the two were big and strong. Then one day Gogowairo came to them and said, "You two are no longer picanins. You are man and woman. You must marry even though you are brother and sister. I will not put a name to you two."

Time went on and children were born to them. The first was a boy; then they had two girls; and by and by they had another boy. These children grew up very quickly, and married, and their children grew very fast until there were many people living at Embi.

One day the old man, who had known the time before Embi Lake was formed, went fishing on the back of Gogowairo. His sister-wife went to her garden to cut some sugar-cane. As she slashed at the cane she cut her finger which bled profusely. Seeing this she plucked a taro leaf and caught the blood on it. This blood she took back to her house and placed it in her clay cooking-pot. Later on she went to the pot and lifted the leaves off the top. She was astonished to find it full of people. Hastily she put back the leaves and waited for her husband.

When he returned, she told him what had occurred. "Hoho!" he laughed, "this is a very good fashion."

Her husband went out and cut a spear and sharpened it, and called his sons, and when they came he told them to take the spear and hunt a pig. While his sons were out hunting they managed to kill a large pig. By and by they met Gogowairo. "What fine boys you have grown," said he. "I will come back and help you eat your pig."

When they arrived at the village, Gogowairo said to the old man, "All the people of Embi fall-in here. Open the pot and let

the people in it fall-in on this side." (The word "fall-in" was probably not used in the old tale. I think Gogowairo would merely tell them to form two groups.—L.A.)

After the two groups had been formed, Gogowairo spoke, "You people of Embi shall be called Berepo." He then subdivided the Berepo into eight smaller groups, and named them Umotaha, Tirembo, Dirogu, Onoho, Kombu, Perohaha, Andirihaha, and Sangara.

"You will live in villages on the foothills of the mountains but the people of the cooking-pot who speak different languages, will go to other parts of the country." And Gogowairo divided the people of the pot into separate groups according to the language they spoke, and these he sent over the whole of the country—to Mamba, to Gira, to Dobodura, to Huhurundi, to Asingi, to Wasida, and to Managalasi, and even as far east as the salt water.

"I will now leave you," ended Gogowairo, "but I shall always have my home in the Lake of Embi."

None of the peoples mentioned as having come out of the cooking-pit have the above legend to account for their origin, but the story of Dodoima told to me by the Buna tribe, who live on the sea-coast north of the Hydrographers, is very interesting, for it, too, tells of the birth of human beings out of a cooking-pit. There is a word in Binandere—"Dodoma"—which means "brethren" (see Copeland King's dictionary). Perhaps the word "Dodoima" is a dialectic variation of "Dodoma."

The Tale of Dodoima.

There once lived at Gaboi village a man called Dodoima. This village was situated on a hill near the sea-coast between the present Emo and Biama villages on the boundary of the northern and north-eastern divisions of Papua.

Dodoima was a very powerful man, so powerful that he killed off all his people, excepting a few that managed to run away into the bush. But one old woman he did not kill, for he thought she would be very useful to him, for she would be able to make his garden and cook his food.

One day he sent the old woman up a coconut tree to pluck a green coconut for him to drink. He had a rather perverted sense of humour, and when the old woman was coming down the tree in the usual manner he made her turn round and come down head first.

When she reached the ground, the old woman was very angry with Dodoima for making such a fool of her, and strode away indignantly when the man had finished his drink. She went to her garden to cut some sugar-cane, but apparently in her anger she was careless and in cutting off a stick she cut her finger deeply. Seeing this blood, she took a taro leaf and collected it and brought it back to the village, where she cooked it in a clay cooking-pot. Shortly afterwards she took off the leaves which covered the pot and saw two boys inside.

"Come out of the pot," she said to the boys; "I want you to do something for me."

The old woman sent one of the boys into the bush for a piece of wood, and when he brought it back she made it into a great spear. The other boy she sent into the forest to bring back another kind of wood, and she showed him how to make a wooden club. Then she sent the two of them into the bush again, to hew down a tree, and showed them how to make a canoe. When all was ready, the canoe was pushed down into the water and the spear and the wooden club placed in the bottom.

"Now," remarked the old woman, "do you two boys think you are strong enough to go and kill Dodoima? He is a very strong man and, if you are not stronger than he, he will kill you both."

"Yes," answered the two boys at the same time, "we are very strong, and we can kill Dodoima."

"Take this canoe," continued the woman, "and go up the creek which runs at the bottom of Gaboi, and in the bush you will find Dodoima."

The two boys paddled up the stream in the canoe, until they saw Dodoima in the distance sharpening a stone adze. Very quietly they paddled up and then left the canoe, and crept up behind the strong man. Dodoima had his back to the salt water, and his face looked towards the bush, so he did not see the two boys, who were now very close. The two boys watched and whispered together, "We will kill this man: we are very strong." Then they saw Dodoima put the stone adze down for a moment, and one of the boys rushed up quietly and grabbed the adze and ran off with it. Dodoima turning round saw the boy running off with his adze.

"Where do you come from?" shouted Dodoima; "you do not belong to my people: I have killed them all." And he rushed after the thief.

When he was almost upon the lads, they turned and drove the spear into Dodoima. This infuriated the man and he rushed at them again, and they speared him again and again, until he finally fell down, when they finished him with a blow from the wooden club. The two boys carried the body to the canoe and blew the kibi shell to let the old woman know that Dodoima was dead. She was overjoyed to hear it, and blew her kibi shell to let the people who had run away into the bush know that Dodoima was dead, and they all came hurrying to Gaboi.

Dodoima was cut up and cooked in the cooking-pots, and small pieces given out to everyone, and to the Dobodura people they gave the entrails.

There were now plenty of people at Gaboi, and many talked strange languages, so the old woman separated the people into groups which spoke one language, and sent them out over the lands even to the Gira River and as far west as Managalasi.

The old woman and her two sons stayed at Gaboi, and it is supposed that they eventually died there of old age.

Hariga, the Man of the Moon.

In the days of my forefathers, there once lived a man called Hariga. He had a very fascinating way with him, and all the women and girls were very fond of him.

The other menfolk of the village became very jealous and angry with Hariga, and at last they conspired to kill this charmer of women. One day they set out to avenge their wrongs, and eventually found Hariga in the forest, where they set upon him and killed him. His body was brought back to the village, and there it was cut up, and wrapped in leaves and cooked in the clay pots over the fire.

After the food had been sufficiently cooked, the pieces were distributed throughout the village. At one of the houses, an old woman was busily sweeping under her house, with a broom of coconut flower stems, and when her portion arrived she placed it on the roof of her house so that it would be out of reach of her dogs, and went on with her sweeping.

When the old woman climbed up to her house to partake of her dainty morsel, she was astounded to see that her piece of meat had jumped up into the topmost braenhes of a very high tree near her house. Higher and higher jumped the piece of Hariga, until it reached the sky, where it rested. When the village men saw Hariga up in the sky they became very wroth with the old woman.

"Here we have killed Hariga," they growled, "because he troubled our womenfolk, and now you have let him get away where we cannot catch him. We might just as well not have killed him, for he is quite as dangerous up in the sky."

And my forefathers spoke truly, for each moon Hariga seeks out our women.

When Hariga first went up to the sky, he was only small like the moon when it is new; but he travelled eastward to the salt water, where there was plenty of food. He had a very large appetite and grew much larger. Since then he has always looked bright and big, though sometimes he looks quite small. But Hariga is never really small; it is only because some clouds cover up part of his body that he looks small.

Doga, the Morning Star.

Along the north-eastern coast of Papua, myriads of tiny fish, locally called Ura, abound in the seas around the shores, for one short period of time in the year. Then innumerable larger fish come to prey upon these swarms, and still larger fish visit these parts to devour their smaller brethren. Many years ago, however, these Ura fish were unknown to the natives living on the sea-shores, and other fish were far from being plentiful.

In the days when fish were rarely caught in these seas, there once lived a man called Borio, who, though very fond of fishing, was seldom successful. He had only one child, a girl called Boriomomosea, who had attained marriageable age, but who would not marry any of the village youths as she had fallen in love with Doga, the morning star. Doga was the embodiment of all the graces that a native woman could admire. Borio had taken his daughter with him once or twice, when he went fishing at dawn, and it was on those occasions that Boriomomosea had learnt to love this handsome youth who shone forth in all his brilliance at that hour.

Her father chanced to learn of this passion, and refused to take his daughter with him on his fishing excursions any more, for, knowing the recklessness of the girl, he feared she might take it into her head to run away from the village to look for Doga.

The months went by, and Borio, thinking his daughter had outgrown her infatuation, one day acceded to her pleadings to accompany him in his fishing canoe. At dawn the two paddled out to the fishing ground, and Boriomomosea once more saw her lover smiling down at her from the east. She took no interest in the fishing, but stared at Doga, so far away.

That night she stole out of her hut and down to the beach where her father's small canoe lay with its prow in the sand. It required little effort to push the light dugout into the water, and, having done so, tiptoed back to obtain one of the paddles, near the doorway of the hut. Once in the canoe she paddled swiftly out into the long silver sea, and turned her prow eastward to meet Doga.

At dawn she was far out of sight of land, and she saw Doga coming towards her. He asked her why she was out in the canoe all alone, and the girl falteringly told him how she had fallen in love with him, as he was so strong and brave and handsome. She pleaded with him to allow her to go to his home where she would make him a good wife. Doga had noticed the girl before, but now he saw her so close he was charmed with her beauty, and readily complied with her wishes.

Away, away, to the unknown country, Doga and his wife travelled, and arriving there the girl-wife settled down in her husband's home. By and by Boriomomosea had a child, but it was not like other children. It was a small white gull, and she called it Kanau. As time went on, she became the mother of many children, and these all had the form of the different fishes we find in the sea. There were so many of them that Doga and his wife fenced in a large playing ground, so that their children would not get lost.

As the years rolled by, Boriomomosea pined for news of her father and mother, so one day she called Kanau to her.

"Fly to the west," said his mother, "and look for the villages near the sea. In one of them dwells my father and my mother. See if they are still alive, and come back and tell me."

Kanau flew westward for a long time, and then in one village he noticed Borio. Somehow he knew immediately that this was his mother's father, and he alighted on the top of Borio's roof. Borio seeing the bird picked up a stone to throw at it, and Kanau flew away, but returned and once more perched on the roof-top. Once again Borio picked up a stone, and once again Kanau flew away, to return for a third time.

The village people, noticing how the bird returned, cried out to the old man, "Don't throw a stone at that bird. It is another kind. Catch it in your hand."

Stealthily Borio climbed to the roof, and suddenly made a grab at the bird, catching it in his hand. Then Kanau turned to the old man and spoke: "Borio, my mother is your daughter Boriomomosea, who left you many years ago to be the morning star's

wife. She has sent me to see if you are all well. Besides myself, she has many children, and they are all fishes. Do you make big nets, and small nets, and small small nets, and she will send you plenty of fish."

When Borio let his grandson go, Kanau immediately flew back to his mother. "Mother," he said, "I found your father, and your mother, and your mother's brother. They are all well, and are overjoyed to hear that you are still alive. I told my grandfather of your many children, and he bid me ask you to break open your fence and send him plenty of fish.

The following day as the dawn was creeping into the sky, and Doga was beginning his daily travels, Borio, who had paddled out in his canoe, was astonished to see myriads of tiny fishes called Ura, swimming close inshore.

"Bring out your small small fish-nets" (Bemo), shouted Borio to the villagers, "Kanau has spoken truly, and the fish have come." All day long the village people busied themselves with their nets catching the Ura. Later on Doga and his wife opened the gap in the fence still wider, and the fish-children swam out helter-skelter after the Ura. The village people, seeing these larger fish swimming about, went back to the village and brought their large komboro nets, and many large fish were netted.

But there were far more fish in the sea than they could catch, and that is the reason why so many fish live in the salt water to-day.

Boriomomosea then said to her husband, "I want to go back to my people. All my children have gone from here and I shall be near them."

Doga answered, "Every morning when I begin my daily work you will see me in the eastern sky. Tell your people, when they see me, that that is the time to commence their fishing, for then they will catch many fish."

An so to this day, when Doga shows forth in the sky, the village people go out in their canoes to catch the fish-children of Boriomomosea.

The Alligator and the Lizard.

Once upon a time the alligator was a friend of man's. He did not bite him, and when he swam about in the water he made much splashing so that man could see him. In those days the alligator was useful to man, and man used the alligator like a canoe

to cross from one side of a river to another or to travel along the salt water.

The alligator lived on the succulent cabbages of palm trees. He had an enormously long tongue, which he used to reach the inside of the palm-tips, where the cabbage was to be found. One day he attempted to get the cabbage of the Ijiga palm, but somehow or other he could not get it out, and pulling at it he cut his tongue off near his mouth. He reared in rage at this disaster, for no more would he be able to obtain the succulent palm cabbage. Some time afterwards a little gecko lizard heard the roaring and said to the alligator, "What is the trouble?" The alligator answered, "No more can I eat the food to which I am accustomed; I have cut my tongue off close to my mouth."

"Never mind," said the lizard, "there are plenty of men to be eaten, and they are good kaikai. You watch me catch flies, and then try and catch man in the same way."

Then the lizard crawled stealthily towards a fly that was resting and pounced suddenly upon it, catching it in its mouth.

"That's the way to do it," called out the lizard triumphantly.

The alligator went away, and by and by he saw a man in the water. Instead of swimming about on top of the water as was his wont, he swam slowly and silently under the water, and caught hold of the man as he had seen the gecko do. And, since that time, the alligator has been the enemy of man, and is always trying to steal upon man when he sees him in the water.

Sago and Taro.

Once upon a time people had very little food. One day an old man was walking along the beach from the Gira River, and he met a small boy. "Where are your father and mother?" he asked the boy. "They have gone to the sago place to make sago," the small one answered. "All right," said the old man; "this shall be a sago country. Plant this sago I now give you, and you will always have plenty of sago to eat"; and he gave the boy a small sago shoot.

The old man went a little farther, as far as the Mamba, and he saw a small child. "Where is your father and mother?" asked the old man. "They have gone to the sago place to make sago," answered the youngster. "This shall be a sago country," said the old man. "Take this sago shoot and plant it and you will always have plenty of sago."

And so the old man travelled southward, handing out a sago shoot to each small lad he met. But after he had passed Bakumbari, on the northern arm of Gona Bay, he met a lad who, instead of answering in the usual manner, said, "My father and mother have gone to their gardens." "Then," spoke the old man, "this shall be a taro country"; and he gave the small boy one taro to plant.

And southward he travelled, but found that the people were all gardeners, so to each village he passed through he gave a small child one taro, saying, "Plant this, and you shall always have plenty of taro." He reached the boundary of the northern division and continued on through the Tufi mark, giving out taro. He went over so far we do not know where.

To this day the people of Bakumbari and northwards to the Gira are sago-eaters, while to the south the people have very little sago, and find it necessary to make large gardens to provide their daily food.

The Dogs and the Firewood.

The dogs always knew how to make fire, and it was through them that man learnt to use the dry lawyer vine to rub against a stick, and so make fire too.

Once the dogs all sat round a fire, but wanting to move their camp they put the firewood on their heads and swam across the river to the new site. Each time they crossed they lost the firewood. One small dog laughed. "Why do you stay by the fire?" asked the other dogs angrily; "you get up and see if you can carry the firewood across the river."

The little dog may have been small, but he was very strong, and he swam across the river very quickly and gave the firewood to the dogs on the other side. And so everybody had plenty of firewood.

Where the Salt Water Came Down.

Near Cape Sudest on the north-eastern coast of Papua, lies some land known to the local natives as Ewaviari, which means "where the sea (salt water) came down." This is the story connected with the name.

In the northern division of Papua the natives grow a variety of spinach in their gardens; there are two distinct kinds, one known as *Ombi* (Amaranthus—edible var.) and the other as *Visingi*. The latter when boiled has a slightly salty flavour.

Once upon a time the people grew much spinach in their gardens. The leaves were plucked and they were boiled in the clay cooking-pots, and the food was considered very tasty. One old woman of the village found that inside the visingi one could obtain water, which when boiled with the spinach gave it a salty taste. As salt was not obtainable in those days, this discovery was very valuable.

She kept her discovery to herself for some time, but one day she was unable to go to her garden, so said to her small son, "Go out to my garden, to where the visingi grows. Take a coconut shell with you, and open up the visingi a very little, and take out some of the water you will find inside. Be very careful not to open up the cabbage very wide, for if you do you will allow the water to flow out."

The son went off to the garden, and there found the visingi patch. He went to one of the plants, and opened it to take out some of the water in his coconut shell, but like all native youngsters he was rather careless, and forgot his mother's warning. He pulled open the leaves, but far too widely, and the water of the visingi flowed out. He tried to stop it, but it gushed out, and flowed all over the place.

It flowed, and flowed, and seemed as though it would never stop. The old woman, seeing the water flowing down from the hill where her garden was situated, immediately realised what had happened and rushed out with a stick to beat it back.

"Go back, go back into your cabbage," shouted the old woman to the water, as she beat it with her stick. But the waters listened not, and continued flowing over the land. Eventually, the last of the water escaped from the cabbage, and the old woman managed to beat the waters round the land near Ewaviari, so that the land inside was dry.

When the salt water reached the land outside Ewaviari, it lay there calmly and peacefully. The old woman was angry with the salt water, and took her stick again and beat the trees, saying, "Salt water, you have now left the visingi, and will not go back to it. But you are not the same as other water, so why should you remain peacefully. In future you will make much noise, and when the wind comes you will break up and roar." And as she hit the trees the salt water got up and made a great noise and broke itself up and foamed.

Ever since then the salt water has been different from fresh water, but had the woman not become angry and beaten the trees the salt water would have remained quiet.

When the salt water came down from the hills, it started behind the old site of Embi village, flowed down past Boru and Urio, then eastward or rather a little south of east to Kanau, and then on to Garuru until finally it reached Ewaviari, now sometimes called Soena, after a small creek near-by.

Why the Creek Ran Dry.

Among the low hills behind Iwaia (lit. "measles") in the northern division of Papua, there once dwelt a tribe of dogs, whose village was called Fukuwio. They were very friendly with the pigs and kangaroos who lived in neighbouring villages. One day they gave a big feast and invited all the pigs and the kangaroos to come and dance. The invitations were accepted, and great were the preparations made to make the feast worthy of the dogs.

While the dance was on and the pigs and kangaroos were singing their old dance songs, these animals became very facetious, and started up a song about the dogs. "All of the dogs are no good; their skin is mangy; it is not like ours, which is so nice and shiny."

The dogs became very wroth at hearing this song, and attacked the pigs and the kangaroos. They killed all the pigs except one old sow who ran away farther into the hills. The dogs chased her, but she dug a hole in a cliff, and closed up the hole when she saw the dogs close at hand. The dogs made vain efforts to dig the pig out, but found they could not open the hole, and in disgust returned to their village. This was a very good thing for the people of Papua, for if they had killed the pig there would not have been any more pigs in Papua, but as it turned out the sow soon give birth to a litter of little ones, and so Papua was saved from being pigless.

While some of the dogs were chasing the pig, others were running after the kangaroos. Most of the kangaroos were killed, but a few managed to escape and avoid being taken. One kangaroo made southward towards Tufi, and reached a river close to a village called Pongani. Here the dog who had followed it all the way managed to catch it and kill it. It gorged itself with the food, but by the time it was ready to eat the liver it found it had developed an enormous thirst after its long run. Being near a creek, the dog put the liver down on the bank, leaned down, and drank deeply of the water. But so deeply did it drink that it drained the creek dry, and it is for this reason that the creek is now known as Sinodo-umindari, which means in English "The dog drank the water."

After the dog had drunk its fill it ate the liver of the kangaroo

and returned to Fukuwio, and thus ended this famous dance of dogs.

It is from this tale that we learn the reason why the creek ran dry, and why there are so many more kangaroos in the Tufi and Baniara districts than there are in the northern division.

Where the Canoes were First Made.

There once lived a man called Iewowatewa. He lived among the bush peoples near the Gira River. In those days there was no river; it was all land. The people noticed that whenever Iewowatewa saw a siruga tree he placed his mark upon it.

"Why do you mark these siruga trees?" the people asked him.

"They are very good for making canoes," he answered.

Thereupon the bushmen put their marks on any siruga trees that they saw in the bush.

One day Iewowatewa said, "We will make canoes," and told the people to cut down some ciruga trees.

"Shall we drag them into the village?" asked the people.

"No," answered the wise man, "we will dig the canoes out in the bush."

All the people then set to work to make canoes, following the instructions of the sage (lit. "grow man"), and while they were making canoes they slept in the bush. When the canoes were nearing completion the wind blew a hurricane, and the rain came down in torrents. One morning they woke to find a large stream flowing near the canoe place, and this stream went down to the salt water.

Iewowatewa then spoke to the people: "You now know how to make canoes. Put them in the river and paddle down to the salt water."

And the sage's instructions were followed, and that is how we learnt to make canoes.

Why the Buna People Left the Mamba.

Many years ago the Buna people lived along the Mamba River. There were two peoples there—the shore people and the water people. The water people lived in canoes. One day the shore people cut many bunches of bananas and cooked them in the clay pots. When the fruit was cooked the shore people divided the food, but would not give the canoe people any of the water in which the bananas were cooked.

The canoe people became very angry and shouted out: "All right, if you wont give us any of the banana water we will go to Buna."

But the shore people would not give them the banana water, so the canoe people left the Mamba and came to Buna, where they have lived ever since.

The Coconut and the Picanin.

The coconut was once unknown among the tribes living near the salt water. Once a man of these tribes went out hunting in the forests with his dog. Going a long way into the bush he suddenly came upon a grove of coconut trees of all ages. Seeing some of the fruit lying on the ground he picked one up and broke it open.

"This looks as though it were good kaikai," he said to himself, and threw some of it to his dog. The dog greedily ate it, and suffered no ill effects. He thereupon took out the rest of the flesh of the coconut, wrapped it in a leaf, and took it home.

His baby son, noticing something wrapped up in a leaf, immediately opened it with great curiosity. "What name this you put in leaf? You get it along bush?" The father answered, "Don't you touch it. It is something I have not seen before. If you eat it you will die. I have given some to my dog."

But his son as soon as his back was turned stole some of the coconut and ate it. "Father," he said, "this is 'U'; it is good kaikai"; and so the coconut was given the name "U." The picanin did not die, and the father, seeing this, said to the village people, "I have found some new kind of food in the bush; I do not know what it is, but my child has called it 'U.' He says it is very good kaikai. I have given it to my dog, and he is not dead, and my child has eaten of it, and he is not dead. Let us all go to the forest and bring back as many of this fruit as we can carry."

And the men and the women and the children all took their dillybags, and New Guinea string, and brought back to the village large quantities of coconuts, called U. Many they ate, but many they put in the ground, and these grew into trees, and ever since then there have been plenty of coconuts in the salt-water villages.

The Rat and the Snake.

When a snake becomes old he goes into the bush and sheds his skin and comes out young again. He does not die; he is immortal. The rat, on the other hand, when it becomes old, just dies in the ordinary human fashion.

Once a rat met a snake. "It is not proper that you should not die. When I grow old I die finish, and am no more. But you, when you get old, merely go into the bush, shed your skin, and return young again. This fashion is no good."

The snake would not listen to the rat, so even to this day the snake goes into the bush to shed its skin, and so does not die.

Why the Swamp Pheasant does not Build a Nest.

Once upon a time the people of Buna had their sleeping quarters under the sea. Each morning they came ashore, and made their gardens and cooked their meals, but when the sun had set they walked out into the sea and slept under it.

One of the tribe was a swamp pheasant called Beguma. He was a wily bird, and each day came to the place where the people made their fires, and took his share of the meal; but at dark when the people went to sleep in the sea he put his head under the water until the last one of the tribe had retired; then he hurriedly drew himself up, and flew to a house he had built in the forest.

When daylight came Beguma went down to the water, wet all his feathers, and came up to the tribe, saying, "Why do I have to sleep so coldly under the water, while you have such a nice warm fire to sleep beside?"

One woman—his sister—who had been keeping an eye on Beguma, thought he was deceiving them, and one night set her baby boy to watch the bird. The boy stayed up after all the villagers had gone down into the sea, but Beguma said to him, "Why do you not go down with the others?" The baby answered, "I want to stay with you." Beguma then became very angry, and hit the little picanin. The baby began to cry, and said, "I don't want to go and sleep with my mother." The bird being angry hit the child again, who cried bitterly. Seeing this Beguma felt sorry for the boy, for after all he was the lad's uncle. He then said to his nephew, "Don't cry; I will take you with me to sleep"; and he took the baby to his house, which was a very fine one. The boy noted everything, and the following morning, when the sun rose, the two went down to the beach.

"Now," said Beguma, "you must not tell anyone what you have seen. Wet your body like I do, and let us go back to the camp fire."

That night Beguma wanted to take the baby back with him to his house, but the child would not go, saying, "I am going to

sleep with my mother to-night.'' The bird was exasperated at this, but did not reply for fear the boy might tell his parents.

The swamp pheasant went away to his house, and the child went down under the sea to sleep besides his parents. During the night he told his mother all that had occurred, then when daylight came the people came ashore. The son told his father to go into the bush and cut posts, and he told him to go and cut timber, and he told him to go and cut lawyer vines for string, and as each was brought he told his father to go and get something else that was required. When all was ready the son told his father how to build the house. The people were overjoyed at seeing this new kind of sleeping place, and hurried off to build houses, too.

When the old uncle came to the camp he was indignant at the trick that had been played him, and he vowed that never more would he sleep in a house.

How Some Fishes Got Their Shape.

There are three very curious fishes to be caught in the waters round Buna. One has prickly spines on its skin, and is called Usuba (Bin. = Uduru). Another is very flat and thin. It is called Ambega (a flounder). The third is named Jebura (Bin. Deburu = puffer fish); it is like a football.

In the ages past, the fish once came to the bush to fight the birds. The fish were stronger than the birds, and in every fight they carried off the honours until most of the birds were dead.

One day a flight of small birds attacked the fish, and fought them so fiercely that the fish ran away back to the salt water. Three fish, however, were left behind, and the birds seeing the Usuba drove many spears into it. Then they saw Jebura, and danced upon him so much that he swelled up (like a football). When they saw Ambega they walked over him for a long time until he became flat (like a piece of paper).

When the birds had gone these three fish struggled back to the river, and thus were able to return to the salt water.

Many of the legends of the Buna tribe who live on or near the sea-coast in the district close to the Buna Government Station, deal with the interpretation of natural phenomena according to the native mind. Unfortunately, not having studied the social system of the Binandere and other allied tribes, I am not in a position to explain exactly what these legends mean, nor the part

played by them in the social and mental life of the people. Perhaps later on, when Mr. F. E. Williams's book on the Binandere is published, we may be able to look more deeply into the true interpretation of these myths and legends.

Still, even so, we can see certain sentiments which express some fundamental ideas of the native or former customs as well as of natural and physiological phenomena which surround his mental and social life.

In the story of Dodoima and also that of Hariga, we see that in days gone by the natives of this district were cannibals, and that it was customary to cook the human body in cooking pots. Apparently, too, it was the body of an enemy who was so treated. If Williams has discovered that the Binandere have ideas which show that humans have a spirit which lives after death, it would not be very fanciful for the native mind to connect the cooking-pot with spirits, for it is very probable that they would believe the cooking-pot to have absorbed a certain amount of spiritual power from contact with the dead body. Then it might follow that in time all cooking-pots might be endowed with a spiritual power, and so, blood of the living having been placed in a pot, the unknown force in it might cause the drops of blood to become living humans.

In neither the story of Embi nor that of Dodoima did we find that it was the female owner of the pot who actually made the people who came out of the pot. In the first story we learn that the woman was "astonished," though it certainly seems strange that she took great care of the blood from her wound, unless she thought that something would happen if she put it in the pot. In the second story, the woman knew what was going to happen. But in neither has the woman been shown to possess any magical powers, for all her other actions are quite natural.

The physiological phenomena connected with catamenia is very easily explained in the story of Hariga. This tale was told to me by a Berepo man, but seems to be known throughout the district, where the words "Hariga" or "Kariga Gari" means "to know the moon," and describes a woman during menses. I remember in a certain court case the interpreter putting the question to the woman, "When did you know the moon last?" and it was partly through this question that I obtained the story of Hariga.

The word "Doga" in King's dictionary means "a planet or big star," but in the above legend it becomes personified in a special star—the morning star. I have noticed in the Buna district that most of the fishing is done during the early hours of the

morning, when the morning star would be brightest. The people apparently do not differentiate between the various stars which show forth in the dawn. Borio and Kanau are two villages in the Buna district. Kanau is the name applied to both terns and seagulls. Ura means a "herd," but seems to have been originally applied to the swarms of small fishes—probably smelts or a variety of whitebait—which make an appearance off the shores for a short time during a certain season. It is interesting to note the importance given to the mother's brother, for, though the people are patrilineal, still the maternal uncle seems to have a nearer kinship after the parents than anyone else. It will in all probability be found that the mother's brother plays an important part in social functions.

All the other legends are from the Buna district, and contain a number of very interesting points which, owing to lack of sufficient knowledge of the people make interpretation difficult. It is worth while drawing attention to the tale of "The Coconut and the Picanin." The child has given a name to something new, that has not been known before by the people, and they have accepted the name given by the child. One can quite understand a child gurgling "U" at tasting something that was unexpectedly very agreeable. The present word for coconut is "Mutari," the "ari" being a suffix.

MITCHELL RIVER.*

By Rev. J. Done (Mitchell River Mission).

The following paper has been written in collaboration with Mr. J. W. Chapman, J.P., who has been at the Mitchell River Mission for the past thirteen years, and who has been able to study the aboriginal at first hand. The information contained herein is therefore as accurate as it is possible to obtain, in fact many a scientific article is built up on less secure foundations.

The Mitchell River, in so far as size is concerned, ranks among the large rivers of Queensland, draining as it does a very large area. It enters the Gulf of Carpentaria about twenty miles south of the 15th parallel of south latitude, while the Walsh, one of its upper branches, rises near Herberton, and another branch commences not far from Port Douglas. Many large creeks and anabranches join the main river, which empties into the sea, in normal times through at least three different mouths; but during the wet season, when millions of tons of water come down, the main Mitchell is then about eight miles wide, and a very lage area of country is inundated. Overflows from the Mitchell then run into the Scrutton, Nassau, and Staaten rivers to the south, while to the north the Coleman and numerous other streams are joined into one.

There is evidence, however, to show that the Magnificent, which is now an anabranch, and during the dry period of the year but a series of lagoons, was once the original Mitchell River. At all events a large stream once ran where the Magnificent now is, but through countless ages alluvial deposits brought down by floods have gradually silted it up, while the main river broke away to the north to form what is now known as the Mitchell proper.

Sinking wells at Kowanyama, the mission settlement on the Magnificent, gives proof of the correctness of this theory, for after a couple of feet of alluvial soil comes sand, and by gradual stages one digs into gravel such as is found in the river bed itself. A few years ago, when digging for water, Mr. Chapman came upon a charred log buried in the gravel some fourteen feet below the surface.

The upper parts of the river are of course surveyed, but the lower portions, though known locally, have never been officially

* Communicated through the Thursday Island branch of the R.G.S.A.

traversed, and thus occupy but an approximate position on the map. The country through which the Mitchell flows is only suitable for cattle, but small portions of land, mostly that bordering the Magnificent and other streams, can be successfully cultivated.

Wallabies and many kinds of native foods abound, hence this portion of the peninsula has always had as large a population as the country could carry, which, as far as can be ascertained, seems to have remained fairly stationary. No doubt the numbers are not quite as large as they once were, for venereal disease has been introduced by civilisation, and it is well known that in times gone by cattlemen have deliberately lessened the numbers of the people with their rifles. Charges are of course made of aggressive acts by the blacks, and it is not at all unlikely that some of these charges are true. The early explorers such as Jardine Brothers were often attacked by them, but can anyone wonder that they were? Read the accounts of, say, Dutch explorations. Wherever they touched land they kidnapped natives, or at least tried to do so, very often after treacherously winning their confidence in order to enable them the more easily to take their prey, so that it is scarcely to be wondered at, if traditions were handed down that all white men (who in the native imagination belonged to the one tribe) were enemies and to be treated as such. Self-preservation has been learned by all peoples, and by none more thoroughly than the aboriginal inhabitants of this land.

The people of the Mitchell are divided into different tribes and half tribes. The chief ones are the Kokamunjen, Kokabeara, and Kunjen, each with its own dialect, while bordering on to those tribes are smaller communities, not strong enough to stand alone but who attach themselves to one of the stronger tribes while retaining their own peculiarities of speech.

There does not seem to have been any idea of "chiefs" among them but probably a system of socialism was more or less practised —socialism, that is, in the sense that everyone helped everyone else, and the old men and the more experienced led by way of example rather than as bosses, and even now, though there are those that are called "kings," it is difficult to find any who can really exercise authority. Their life is necessarily strenuous and industrious; weapons must be kept ready for use, and need constant renewal. With their primitive tools this naturally means much labour. Among the tribes of the Mitchell the spear and wommera and fighting-stick are generally used; boomerangs of a crude kind are occasionally made, but are not much in vogue and seem to have

been a late introduction among them. While talking of weapons it might be mentioned that "teeth" are often effectively employed. For instance, in a recent scrap I saw between two young bloods, the one had a piece taken out of his cheek, but he had retaliated by biting the other fellow's nose.

It is of course impossible accurately to account for the origin of these people, and any theory is more or less guesswork. None of the tribes of the Cape York Peninsula practise circumcision and other kindred rites, such as are found among the aboriginals of the western part of Queensland and the Northern Territory. In this respect the Peninsular tribes are like the natives of the Torres Strait islands. I pointed out in a previous paper that there is a distinct resemblance to the mainlander among the islanders as far north as Mabuiag. Then, too, there are quite distinct types of individual. There is, of course, what is generally regarded as the typical blackfellow, but there are many with straight and pointed noses, and even Jewish noses, and thin lips. The majority have the usual straight hair, but woolly locks are not by any means uncommon. Might not these items point to an early migration into the Peninsula through the islands?

In fine weather the people live in very rough and scanty bush shelters which are really erected as breakwinds. Behind these a hole is scratched in the sand to sleep in, just in the same way as a dog makes himself comfortable, and, of course, the ubiquitous fire. But wet weather produces a building of another character, and much the best I have seen on east or west coast of the Peninsula. This hut is a perfect hemisphere about 4 feet high, thatched neatly with cabbage-tree leaves, and absolutely waterproof. For the entrance a small opening is made near the ground, through which the occupants crawl on hands and knees. Extremely hot and steamy these houses are, and of course insanitary, but they certainly are artistic and ingeniously constructed.

Though living near the sea and along the banks of rivers, the Mitchell River natives are not seamen. They make no canoes such as are made by the tribes on the Archer River about 100 miles to the north, but they are good swimmers and often have to swim long distances across rivers, especially in times of flood. A number of the men have had some experience on the Mission vessel, but taken generally they would not be of much use on pearling and beche-de-mer luggers, besides which they can and do earn £2 per week and "keep" on cattle stations, where they are regarded as indispensable.

They are great traders, and have been for generations, as well-defined trade routes exist. I do not suggest that these routes are suitable for motor traffic, but in many places deep ruts are worn by the passage of many feet. No stone is found in the flat country of the lower reaches of the Mitchell, hence stone axes were eagerly sought, while in return shells, ochres, spears, and lime made from fish-bones were sent. These articles passed from tribe to tribe until on reaching their destination they were many miles from the place of manufacture. Kennedy's expedition, for instance, found iron tomahawks among some of the aboriginals they met, and those implements must have come from a great distance along one of these trade routes.

Every burden is carried on the blackfellow's head, even a corpse on its final journey to the cemetery, the bundles being perfectly balanced. I have seen them carrying sheets of corrugated galvanised iron for the Mission, although they had been expressly told not to touch it. For convenience in carrying, each sheet was doubled over, and duly straightened out by being trodden on, just before delivery at the Mission. From the native point of view they were helping; the Superintendent differed, however, and I think it is wisest to cast a veil over his remarks as he viewed his spoilt iron.

Trading reminds us of the message sticks about which so much controversy rages. Mr. Chapman, after much investigation, is of the opinion that the sticks convey no message at all, but that the carrier of the stick brings the message by word of mouth, the marks on the stick being mere ornamentation. It might be mentioned that this opinion coincides with that of Dr. Roth, and is referred to in his book, "Ethnological Studies," page 137.

Corroborees naturally play an important part in the lives of the aborigines, and serve as a pastime, as a welcome to visitors from other tribes, and for ceremonial purposes. Most of the dances are pantomimes, and are representations of fighting and hunting or else mimicries of the actions of birds or animals; in fact, anything which takes their attention may be turned into a dance.

Sickness and death are not regarded as natural events, and the cause must always be looked for. Here the camp doctor comes in and does his worst. Possibly a stone or piece of iron may be the trouble, and is removed with much ceremony. In other cases the cause may be traced by him to some enemy who in earlier times (if not now in some parts) would be suitably dealt with. For some complaints bush medicines have been found which are at times successfully employed.

Every year when the first floods come down the river, schools of fish take advantage of the rising waters to make their way to the sea, presumably for breeding purposes—catfish, barramundi, and what are locally termed "jewfish." These last are new to me; the head is somewhat like that of a flathead, while the body and tail resemble an eel. At the end of the wet season these fish return and are caught by the people in a way peculiar to themselves. A weir of green bushes and grass is built across the stream, rising about 6 feet above the level of the water. This height is necessary because the fish will leap over obstacles in the path. A large hole is left in the centre of the barricade above the water, and the upper side of this hole is covered by a large basket arrangement. After these preliminaries all the fishermen have to do is to examine and empty the basket.

Now, it is generally assumed that the aborigines are everywhere dying out. Most likely that idea is prevalent because most people live where there are no natives, or where they have been helped to die out. Where they come into close touch with civilisation they seem to be doomed, but in their own environment and away from the evils of civilisation they need not die out. At the Mitchell, for instance, the population seems to remain, as I have said, at about what the country can feed, but where conditions are favourable, such as on mission stations, they actually increase. About here families of four, six, or even ten are by no means uncommon, and many children are met with among the wild people living in the bush.

Then again it is often asked. "Can anything be done with these people?" If what is meant by that is, can they be exploited for the benefit of the white man—and too often it is—the answer is emphatically "No"; the day for that sort of thing is done, and even the judicial courts of our land have pronounced the aboriginal a "free man." But if the question means, can they be taught useful crafts so that they can provide for increasing needs, and be an economic asset to the country, then the answer is undoubtedly in the affirmative. They are capable of learning whatever is taught them. From an educational point of view they are good material; they can readily acquire a knowledge of any of the trades, and it is not unknown for a pure-blooded aboriginal to be acquainted with the sciences, to lecture before a university of white students, and to work as the associate of scientific men.

The essential thing is to give them the chance.

A REVIEW OF THE ABORIGINE.

By T. A. Williams, F.R.G.S.

I have pointed out in previous papers the many suppositions in reference to the origin of aboriginal languages, and the many theories advanced as to their origin. There is a wonderful diversity of languages observed among the aborigines of Australia. The language of the same stock may be of very different material in respect of each other, or, in other words, the corresponding words in each may be very different, but still they have all been cast, so to speak, in the same common mould, their grammatical construction is identical or nearly so, and the stream of thought in the formation of them all has evidently flowed in the same channel.

The black natives of Queensland give distinctive and remarkably appropriate names, descriptive of the national features or of the physical qualities by which it is distinguished, to every remarkable locality in the country, and the number of these names, and the consequent facility with which the natives can make appointment with each other, are incredible to a European. Every rock, river, creek, mountain, hill, and plain has its aboriginal name. The ease with which appropriate names are given to objects or implements of European civilisation with the nature or use of which they are unacquainted is remarkable.

In the exercise of their inventive faculty the aborigines would appear to be superior to their neighbours north and east. When the Melanesians were first visited by European missionaries and had frequent opportunities of seeing books in the hands of the missionaries, they had, of course, no native name for the strange object at which they saw the white strangers so often looking, and had no conception whatever of its use. They waited patiently, therefore, without venturing to give it a name until the missionaries told them what it was and what to call it. It has consequently received the English name, with the change necessary to the Melanesian language, and is known throughout the South Sea as "Na Buka" = the book.

The Queensland native, however, seems to scorn to be indebted to the white man for a name for the foreign object or to confess the same poverty of invention as the South Sea Islanders had exhibited, and the mental process by which he invented an appropriate name for it it as amusing as it is original.

It must be borne in mind that the Queensland aborigine was not made acquainted with books in mere infancy of literature. His first knowledge in this direction is in all likelihood made through one of the latest issues from the press in London brought out by one of the recent European arrivals in the shape of an attractive volume bound with cloth. This new object he proceeds to examine with the keen eye of a naturalist, anxious to ascertain from its external characteristic under what order or class in Nature's system he ought to place the undescribed plant, mineral, or animal he has discovered. He observes, accordingly, that this European curiosity or work has two covers or shells finely marked, that it opens and shuts, that it appears to have a hinge at the back, and in virtue of these characteristics he consigns it to its proper place in his system and gives it the name of "Mooi-oom" = a mussel.

The Queensland aborigines are fearless, but neither bloodthirsty nor ferocious. Custom or example may sometimes lead them to bloodshed, but it is usually in accordance with their prejudices or to gratify their momentary excitement of passion. We often hear the remarks passed by some who evidently know very little of the native, that he has many vices and few virtues. Taking a retrospect of the many years spent continuously with the wild native of the Peninsula, honestly I fail to see he is more vicious in his propensities or more virulent in his passions than are the large number of the town classes of what are called civilised whites.

In intellectual capacity, the aborigines have been held to occupy a low position in the scale of humanity. Certainly they do not appear to have descended from a higher condition of civilisation, for from my observations there are no traces of such transition anywhere; nor, on the other hand, is there any evidence that they have advanced in any degree from the primal condition. That they are capable of permanent improvement has been amply demonstrated when the work on settlements is reviewed, and that they have proved themselves apt pupils in adapting the benefits of civilisation when properly controlled is beyond cavil.

They certainly are much like children, and at first their brain would seem to be only partially developed and incapable of being instructed beyond a certain limit, but, when handled in a sympathetic and experienced manner, it is found their perceptive faculties are great. This is evinced in their skill as trackers and many other ways, even equalling if not exceeding the American Indian in this respect. Their manufactures are of the rudest kind, being confined to mats, nets, bark canoes, and weapons for hunting and war. No

attempt at any textile fabric has been known to have been made by them, nor do they appear to have any idea of invention or improvement in their articles of daily use; yet, under the supervision of a white teacher, they readily learn to sew and make garments, and in other directions are very apt pupils. Any person who has become well acquainted with the habits of the aborigines will have remarked the absence of the faculty of invention which they manifest. The power of calculation they possess in a very small measure, but their power to invent, if it ever existed, seems to have died out altogether. An aborigine will imitate what he sees others do, but it seems impossible for him to originate a fresh way of doing anything, or to improve upon the method which he has been taught.

It has been advanced that the human languages were developed from the utterances natural to animals. If this were true, we might expect to find amongst the aborigines a language very little superior to the cries of the beasts of the field. But what do we find? That they possess a language which is remarkable for the complexity of its construction, the number of its inflections, and the precision with which it can be used. Although the number of words contained in it are comparatively few, perhaps not more than two or three thousand, yet they seem to be remnants of a tongue rather than a language in process of development. The names of human relationships are more copious than in English. In many respects there is a nicety of expression not found in our own language. They possess the faculty of learning other languages readily, but do not appear to have any power to invent language.

The natives follow many customs of a more laborious and burdensome character, involving much suffering and having strange rites connected with them. But while these people observe them with great exactness and particularity, they can give no account of their meaning or origin; the meaning has died out and they are observed only from superstitious ceremonialism. The aborigine in his uncivilised state, from childhood to old age, devotes the whole purpose of his life to the gratification of his appetite and passions. He seeks to extract the utmost sweetness from mere animal pleasures, and consequently his nature becomes embruted. The aborigine eats and drinks with a whole-hearted devotion and seriousness, which shows that every faculty is absorbed in occupation. The passions are never restrained, except so far as custom prescribes, and consequently assume an imperious character; the man is entirely under their sway and gratifies them to the utmost, although the body should die from the indulgence.

The natives are passionately fond of music and singing accompanied with the beating on a shield of a club, knocking two boomerangs or nulla-nullas together, or striking themselves on the thighs with open hands; leaping, dancing, and clapping of hands is one of the chief amusements of their merry corrobories. The words on these occasions are often extempore and simple enough, but the joyous idea which may occur to the principal performer who acts the part of master of ceremonies is immediately expressed in the cadence of song, and repeated again and again by the delighted company. Games in mock imitation of a kangaroo or emu, killing an alligator, hunting for wild honey, in which the bodies of the performers are fantastically painted and decorated, are also a never-failing accompaniment to their jovial gatherings, which, at least in their native and unsophisticated state, are never in any way disgraced by unseemly conduct.

This amusement always takes place at night by the light of blazing fires. They dance to beaten time accompanied by a song. The dancers paint themselves white in such remarkably varied ways that no two individuals are all alike. The surrounding darkness seems necessary to give due effect, all these dances being more or less dramatic; the painted figures coming forward in mystic order from the obscurity of the background, whilst singers and beaters of time are invisible, making a highly theatrical effect. Each dance seems most tastefully progressive, the movement being at first slow, and generally introduced by two persons displaying the most graceful motions, both of arms and legs, whilst others one by one drop in until the individual is nearing the truly savage attitude of the corroboree jump—the legs striding to the utmost, the head turned over one shoulder, the eyes glaring and fixed with savage energy in one direction, the arms raised and inclined towards the head, the hands usually grasping one or the other of their warlike weapons. The excitement which this dance produces in the savage is very remarkable. However listless the individual —lying half asleep perhaps, as is often the case when not intent on game—set him to this dance and he is at once fired with sudden energy; every nerve is strung to such a degree that he is no longer to be recognised as the same individual.

The identity of the aboriginal race does not imply an absolute identity of manners, customs, and practices all over the State; certain customs appear to have become absolute in particular districts, certain habits have been gradually disused, as being less adapted, probably, to the climate or locality. For example, it cannot be doubted that the custom of losing two front teeth at

the age of puberty, as well as the wearing of a bone or shell, or other ornament, in a perforation made for the purpose in the cartilage of the nose, and other similar practices, were ancient and universal customs. Although some tribes still adhere to these practices, others have quite discarded them, and as these people are brought more and more into contact with civilisation so these old customs and traditions disappear.

The same differences, evidently suggested by the climate, and the habits and pursuits of the natives of different districts, are observable in their habitations. Where the nature of the country, as well as their own inclination, bind the natives to a migratory life, as well as in the interior, generally a mere breakwind composed of bushes or a piece of bark arranged in a semi-circular form constitute their dwelling. But in localities where food is abundant, in the way of fish, &c., the native huts are of a more substantial and superior character, the frame being composed of strong vines crossing each other in all directions and bound together at the intersections; the covering is generally of tea-tree bark and is so compactly laid on as to keep out the wind and rain.

It is not uncommon to hear intelligent people speak of the aborigines as a race which within a few years is certain to become extinct. They point to the diminished number of the redmen of America and Maoris of New Zealand, and declare their conviction that it is the law of nature that the uncivilised should die out to make way for the civilised—in fact, that low-class races should perish in order that high-class races might take their places. Very little, if anything, is said in opposition to such statements, and it seems to be taken for granted that they are correct.

Although quite willing to grant that appearances, as far as they are connected with Anglo-Saxon colonisation, are altogether in favour of these opinions, yet, when a wider view of the matter is taken, facts may be seen which suggest that these assertions may not be so correct as they appear at first sight. If we look very far into the history of the world, we see that a process of colonisation has been going on, and it has not been the invariable rule that the barbarous races should die out in the presence of the civilised. To take a familiar instance: The ancient Britons did not become extinct after the advent of the Roman invaders; nor have the aboriginal races of America, although treated with greater harshness under the Spanish and Portuguese, died out so rapidly as some equally fine races, such as the North American Indians.

When the aborigines are brought into contact with civilisation, they are exposed to influences of which they have no experience,

and the evil results they cannot guard against; the very food and drink of the white people are strange to them, and they are likely to injure themselves by the use of it. So much so that the Government of this State has forbidden the giving of intoxicating drink to natives. This experience of the native leads to all sorts of injurious and fatal consequences. In their native state these people are able and careful enough to make laws and regulations for their own benefit.

At present the aborigines are being injured, but not so much by cruelty as by ill-judged kindness; they are treated by many as almost being without reason; they are foolishly humoured and spoiled, and it is no wonder if they become like spoiled children, and ruin their health and condition by self-indulgence. The restraints of native law, which were to a great degree beneficial, have been removed by the presence of Europeans, and the consequent inability of their chiefs and elders to enforce it; thus, lawless and unregulated, sometimes unwisely indulged, at others half-starved, sometimes clothed, at other times naked, the prey of his lusts and passions, what wonder if the aborigine goes rapidly to destruction and death!

CANBERRA LECTURE.*

By Capt. J. Francis, M.P.

The founders of Federation saw the necessity for making provision whereby the Central Government would be able to function untrammelled by State or local consideration, and in choosing a locality for its seat of government Australia went through an experience very similar to that of the United States of America. Strong local influences were exerted in the interests of particular sites, and the Parliament found very great difficulty in making a final selection.

Probably no other large national undertaking in Australia has been commenced and carried on amidst such a lack of knowledge and interest on the part of the general public as Canberra—the Federal Capital. There have been several causes for this, some of them of political origin and others due to misconception of the true facts, both in regard to the proposal as an ideal and the site for the city. People who did not desire the existing state of things to be disturbed allowed gross misrepresentations to gain ground until it became a common experience to hear contemptuous phrases used in connection with the project.

There is no justification for such an attitude, either in the relation to the scheme for the establishment of a Federal Capital or to the site chosen for it, and it is highly important that all Australians should know more about this important work and take a pride in its successful accomplishment. Some day we will all be proud of our Federal Capital—it will be to us what London is to Britain, and what Washington is to the United States of America.

Not only is the building of the capital city a statutory obligation, but it will be a great national advantage.

There is little doubt that the Federal Capital will soon become the home of many large institutions, as it is centrally situated with respect to the various States. The means of access to it will shortly be greatly improved and there will be no hardship whatever in making the journey. It is fast becoming a definite place of call for tourists, particularly from abroad. There is already a disposition on the part of interstate bodies to hold their annual conferences

* Synopsis of film and lantern slide lecture to the R.G.S.A., Brisbane, 31st Aug., 1927.

at Canberra, which they may do in congenial surroundings, at the same time avoiding the somewhat difficult questions which often arise in selecting a State capital for their purpose.

Constitutional Provisions.

The establishment of the seat of government in the Federal territory is one of the obligations imposed by the Constitution of the Commonwealth of Australia. It is provided in section 125 of the Constitution that "The Seat of Government of the Commonwealth shall be determined by Parliament and shall be within the territory which shall have been granted to or acquired by the Commonwealth, and shall be vested in and belong to the Commonwealth, and shall be in the State of New South Wales and be distant not less than 100 miles from Sydney. Such territory shall contain not less than 100 square miles and such portion thereof as shall consist of Crown lands shall be granted to the Commonwealth without payment thereof.

"Parliament shall sit in Melbourne until it meets at the Seat of Government."

This provision was embodied in the Constitution to adjust the rival claims of Melbourne and Sydney to be the Australian capital. It was a compromise arrived at when it was made quite clear at the Federal Convention of 1899 that New South Wales would not enter the Federation unless the seat of government was established in that State.

Selection of the Territory.

In choosing a locality for the seat of government, Australia went through an experience very similar to that of the United States of America. Almost every town and village petitioned Parliament that their district was the most suitable for the establishment of the Federal Capital. Finally the question was submitted to a Royal Commission. Albury, Armidale, Bombala, Lake George, Orange, and Tumut were submitted to the scrutiny of this Commission. Canberra was not then thought of. The Commission recommended Dalgety, but when the matter came before Parliament the House of Representatives voted for Tumut and the Senate for Bombala, and a deadlock occurred. Ultimately both these sites were set aside in favour of Dalgety.

In 1908 a Bill was introduced to determine to move definitely the seat of government in the neighbourhood of Dalgety, and the whole issue was once more raised; the Bill finally passed by both Houses with the substitution of Yass-Canberra for Dalgety.

The final adjustment with the State of New South Wales gave to the Federal Parliament 900 square miles of territory around Canberra and 2 square miles for a port at Jervis Bay, and 2,300 acres there for Defence purposes.

Canberra, which has been richly endowed by nature, is 203 miles from Sydney and 900 miles from Brisbane. The city lies in an amphitheatre of hills—the valley of the river Molonglo. The general contours of the gently undulating country lend themselves to the purposes of effective city design, and streets of easy gradients can readily be laid out; prominent hills of moderate altitude present suitable sites for the principal public buildings. Canberra city area embraces 12 square miles with 100,000 acres in reserve for parks, roads, and other public purposes outside the city area. The balance of the territory is used for sheep-runs, fruit and dairy farms, and reafforestation schemes.

Administration.

In the early days the Federal Capital Territory was under the joint control of the Minister for Home and Territories and the Minister for Works and Railways, the work being carried out by an administrator. At first the old laws of New South Wales remained the laws of the territory until they were varied by ordinances passed from time to time by the Commonwealth Government. The effect of the Great War was to considerably reduce the funds available for development of the territory; in fact in 1920 the work was practically suspended. The completion of the Federal Capital was again seriously undertaken in 1924, when a Commission of three, under the chairmanship of Sir John Butters, was appointed with very full power to administer the capital and expedite its construction. The Commission is government and municipal council in one. It leases you a home site and grants you a dog license.

It should be understood that Canberra is quite different from other towns in Australia, as there is no need or scope for a municipal council with aldermen representative of local ratepayers. Its form of government is similar to Washington, the capital of the United States, where the reins of government are also in the hands of a Commission of three. It is obvious that, where a capital city has to be built from the beginning with the people's money, the ordinary municipal government is not suitable, as a study of the developmental phases of the Government of Washington clearly shows. It should be borne in mind that the money which is being spent in Canberra is that of the whole of the community and not only of the ratepayers of Canberra. The

Commission is a corporate body similar to a company, except that it is not responsible to shareholders, but to all the representatives of all the people.

Construction of the City and its Services.

After the exact site of the city had been selected, an international competition for its design was held in order that the best possible plan might be obtained for Australia's capital. The competition was held in 1912. One hundred and thirty-seven designs were submitted and the first prize was won by Mr. W. B. Griffin. His plan allots splendid sites for Parliament House and the main administrative buildings, and provided for a very attractive scheme of beautification by a chain of lakes on the Molonglo River with ample provision for tree planting and parking which are a general characteristic of Canberra as a garden city. In consequence of the economic after-effects of the war, the main scheme is being postponed, and it has been decided to substitute works of utility and simplicity to meet the requirements of the next generation or two, at the same time conserving all the principles of the adopted plan so as to leave the way open for carrying out its more ambitious projects at some future date.

Parliament House is, of course, the main object of interest so far as buildings are concerned. It stands in the centre of the area set aside for governmental purposes, which is being converted into a huge park of 132 acres, the various official buildings being disposed between gardens and avenues of trees. Parliament House, which is situated on the side of Capitol Hill, may be seen from a considerable distance in almost every direction, and magnificent views are obtained from its balconies and its flat promenade roof. It is a large white building of simple and dignified architecture, covering about 3½ acres; 5,000,000 bricks and 2,000 tons of cement were used in its construction. It contains 182 rooms. In addition to the two main Legislative Chambers, it contains a library, dining and recreation rooms, and extensive accommodation for offices, party rooms, and for all those services which are essential for the Parliamentary machine.

Canberra is going to be the finest garden city in the world, and with painstaking care and intensive thought everything is being done to avoid the possibility of traffic congestion, inadequate parks and gardens, failing water supply, factory smells and slums—evils to which most of our capitals are unfortunately subject.

Zoning is being assiduously applied. Everything is zoned. Political and administrative buildings are grouped; shops are

grouped; businesses are grouped; minor industries are grouped; and away over to the north, outside the boundary of the city proper, a large area has been set aside for major industries.

The construction of garden-lined avenues and roads is proceeding. Over 250 miles have been formed. Several residential areas comprising about 2,000 homes have been laid out, and engineering services such as roads, sewerage, drainage, and water supply have been provided. The water supply for Canberra is obtained from the Cotter River, a tributary of the Murrumbidgee River. A storage reservoir has been formed on the Cotter River where it joins this river. The catchment area is about 170 square miles. The dam is 60 feet high, and has a capacity of 400,000,000 gallons. Facilities exist for enormously increasing the supplies if necessary. The water is conveyed from the Cotter through a tunnel under the Murrumbidgee to a pumping plant on the right bank of the river, and from there to service reservoirs on Mount Stromolo, Red Hill, and Mount Russell. The city sewerage has been completed, and includes 18 miles of large sewers with sedimentation tanks and filters at Weston Creek. The system is operated by gravitation throughout.

Electric Power and Lighting.—A modern power-house has been erected in order that light and electrical energy might be transmitted to all parts of the territory where constructional work is proceeding. About 50 miles of high tension transmission, lined with necessary substations, have been erected.

The Commission's forestry operations are being carried out on a large scale, over 8,000,000 pine trees have been planted on Mount Stromolo. This healthy young forest is quite a feature of the territory.

The Speaker's Chair and Historic Despatch Boxes.

The chair in which the Speaker of the House of Representatives will take his seat in the permanent home of the Parliament of the Commonwealth of Australia at Canberra is an exact replica of the Speaker's chair of the House of Commons at Westminster, and is the gift of the United Kingdom Branch of the Empire Parliamentary Association, comprising members of both Houses, "as a fitting symbol," to quote the words of the scroll of presentation, "of the Parliamentary tradition which binds together the free nations of the British Commonwealth."

Great Traditions.

Like the original, the replica is a noble example of British workmanship in carved oak. It stands 13 feet 6 inches high. The Royal Arms which surmount its canopy are carved in a piece of old oak taken from the roof of Westminster Hall, dating back to the 13th century and the reign of King Richard II., and hanging flaps or arm-rests at the side are fashioned out of timber from Nelson's flagship H.M.S. "Victory." It will serve, therefore, as a reminder of the glorious history of the British race, and of the valiant part which the Navy has played in building up a world-wide Empire.

There could not be a gift more appropriate and precious from the Mother of Parliaments to the youngest Parliament in the Empire —the Parliament of the Australian Commonwealth—than this replica of the Speaker's chair in the House of Commons at Westminster.

The King's Gift.

By a happy thought of the King, two replicas of the famous "despatch boxes" on the table of the British House of Commons have also been sent to Canberra as a present from His Majesty, to be placed on the table of the House of Representatives. The purpose of these boxes in the British House of Commons, placed as they are, one on each side of the table, is to afford a rest for the papers of Ministers and Leaders of the Opposition when addressing the House.

The replicas are made of rosewood, lined with green leather and ornately bound with oxidised silver, and are such faithful copies that they reproduce the marks made on the originals by the signet ring worn by Gladstone as he vigorously thumped the box during his speeches.

Brief Description of Films—Canberra in Pictures.

The film opens with views of the territory, which is 900 miles in area and consists mainly of open spaces or rolling hills, bordered by high mountain ranges. The film depicts it as it was a few years ago; and Canberra, as it is to-day, with its open spaces, but possessing scattered cottages, hotels, and other modern buildings. It is over a century since the district was discovered. The official residence of the Governor-General (Yarralmula House), though only 36 years old, carries traditions of early settlement days as far back as 1827, and the Church of St. John the Baptist had its beginning in 1841. Both these historic edifices are viewed on the screen.

The film also shows the turning of the first sod in the establishment of Parliament House; types of cottages erected; views of the Telopea Park School, and of the Cotter Dam, which will be capable, when completed, of impounding 1,400,000,000 gallons of water.

The Official Opening Ceremony.

The whole of the ceremonies on the Opening Day are clearly shown.

Firstly, the arrival of Lord and Lady Stonehaven is filmed. Then, the Royal Progress, the Royal carriage being accompanied by the New South Wales Mounted Police and a detachment of Light Horsemen.

Aeroplanes soar overhead, and in the distance clouds of smoke from roaring guns can be seen.

The Duke and Duchess of York arrive, with full ceremony, after which a ceremony is held on the steps of Parliament House—the turning of the key, and the historic gathering in the Senate Chamber.

The review in the afternoon is also clearly shown.

The films, which are remarkably clear and most interesting, show what possibilities there are in Australia for making Australian films.

ANNIVERSARY ADDRESS TO THE ROYAL GEOGRAPHICAL SOCIETY OF AUSTRALASIA, BRISBANE.

By His Grace Archbishop Duhig, D.D., F.R.G.S.A., President.*

Since 1926, when the Mackay Expedition started from Adelaide to explore the south-western corner of the Northern Territory, accompanied by Dr. Basedow as Surveyor and Geologist, up to the present time, there has been no notable activity in the field of Australian exploration. In New Guinea, as might be expected, the position is different, for the splendid achievement of Mr. C. H. Karius, Assistant Resident Magistrate, in crossing that great territory from the Fly River to the Sepik on the opposite side of the island, stands out as one of the greatest exploits since Sir William MacGregor's famous ascent of Mount Victoria, the culminating peak of the Owen Stanley Range. For this Mr. Karius has been awarded the Patron's Medal of the Royal Geographical Society. It is, however, on the Antarctic that public attention is at present focussed, and will be for some considerable time.

The history of Polar Exploration and discovery in both hemispheres of the globe is interwoven with both romance and tragedy, the latter unhappily of but comparatively recent occurrence in the saddening fate of Scott and Shackelton, while the former takes us back to the great exploits of the early pathfinders on the desolate shores of the vast Southern Continent and islands adjacent thereto. Fired by the spirit of romance or greed of material gain, men have gambled with death in the desert wastes of Asia and Africa and in the icebound wilds of blizzard-swept regions of far Northern and Southern latitudes. There seems to be an irresistible fascination in such hazardous enterprises—the more the danger the greater the fascination. Disaster is often courted in a variety of forms, and one cannot help wondering why. The gains can never be commensurate with the great sacrifices so often made.

Although it is only in comparatively recent times that navigators and explorers have reached and crossed the forbidding ice barriers of Antarctica; even the South Pole itself has been conquered by Scott and Amundsen, yet it is only when the commercial prospects become attractive that international competition

* Delivered at the Forty-fourth Annual General Meeting, 7th August, 1929.

assumes world-wide proportions. Lured by the romance of discovery and hope of gain, the early navigators set out for unknown lands and uncharted seas in poorly equipped ships at the risk of life and limb, with but scanty provisions against the dread enemy, scurvy, and often courting disaster in various forms. Thus we find that the first of these to reach high Southern latitudes was Le Gentil de la Barbinais, who as early as 1716 reached 61° 30′ South. And at various intervals he was followed by a host of other daring navigators, including Cook, Nares, Wilkes, Amundsen, Scott, and Shackelton, down to recent times.

Although Shackleton got no farther south than 88° 23′ in 1909, he was successful in locating the Magnetic Pole, on Wilkes Land, on which occasion he was accompanied by Sir Edgeworth David, an Honorary Member of this Society, which had the distinction of receiving Amundsen at the rooms of the Society, Brisbane, on his return from the South Pole and hearing the first account of his fine achievement at a great meeting of the members in the Centennial Hall. But some years before this, it is interesting to note, local attention had been drawn to the beginning of modern commercial enterprise in South Polar waters, by the somewhat romantic landing of C. E. Borchgrevink on the shores of the Antarctic Continent. Afterwards he set out in the "Southern Cross," fitted out by Sir George Newnes, and wintered at Cape Adare, but did not reach farther south than 78° 50′. Before his Antarctic adventures Borchgrevink, it is interesting to recall, had gained a certain degree of local notoriety. Employed for some time in a survey camp in the Beaudesert district, one of his first bids for distinction was his claim of having climbed to the top of Mount Lindsay, regarded as a very daring feat in those days, and even now a matter not to be lightly considered. Of present-day activities in South Polar regions the daring enterprises of Commander Byrd and Sir Hubert Wilkins claim first attention. Already the latter has added materially to our knowledge of the geographical condition of Antarctica by his discoveries in Graham Land. Formerly interpreted as a peninsula, this is now shown to consist of two major islands, separated by a winding ice-filled strait about the Antarctic Circle. The southern island is separated from the mainland of the continent by a broader ice-filled strait with a large and several small islands at its eastern end.

The insularity of Graham Land raises an interesting historical point. According to a "London Times" correspondent, "If Graham Land were actually a part of the Antarctic Continent the honour of first sighting and charting any part of this territory

would fall to an Englishman, Bransfield." This honour passes to Dumont D'Urville, who sighted Adelie Land in 1840, anticipating the American explorer, Wilkes by a few days.

On the other side of the Antarctic, Commander Richard E. Byrd has established himself for a two-years stay, preparations having been completed for the long winter night and preliminary flights made over previously unexplored territory bordering the Great Barrier and the Ross Sea Dependency.

Byrd set out with the intention of making a series of flights along the line of which a number of supply stations will be established for the benefit of the geologist and other specialists who will prosecute detailed studies on the ground. A number of high-altitude flights will also be made for the study of weather conditions aloft, upon which light will thereby be shed for the first time.

On the other hand Wilkins plans to photograph the details of ice border, glacial tongues, mountains, and other features visible from his 'plane. In this way he aims to be able to select sites for the meteorological stations that he has long planned to establish.

Contemporary with these American enterprises in high southern latitudes, Australia will be worthily represented in the combined attack on the Antarctic ice barrier. Inspired by the desire to participate in the solution of the unsolved problems of Polar climate, physiography, and oceanography, so important to the scientific and commercial life of the nation, the Commonwealth Government has wisely arranged to send an expedition to the far South under the command of Sir Douglas Mawson, whose former experience as an intrepid explorer in those ice-bound regions augurs well for the success of such an important undertaking. The good barque "Discovery," so well known as Captain Scott's flagship on his ill-fated expedition to Victoria Land in 1901-1904, will carry Sir Douglas Mawson and his companions to the far South on their quest for new lands and additions to our knowledge of the secrets that are hidden in those far-off icebound regions.

Important as the gains to geographical science may be by such an enterprise, it is the commercial prospects that will appeal to the public imagination, and it is these that are likely to untie the purse strings of the wealthy in material support of the undertaking. Whales and seals are known to abound in those Polar waters, and for some years their exploitation has enriched the shareholders of the Scandinavian companies that have operated there. In the neighbourhood of Bouvet Island alone, a comparatively small area of a few square miles, 800 seals were taken recently during a

month's cruise in the locality. Since the Norwegians sent their floating factories and associated craft to operate in the far South the slaughter of whales and seals has been enormous. Formerly they made use of a base in New Zealand for carrying on the whale fishery business. But they have now succeeded in annexing Bouvet Island to the Norwegian Crown, and will no doubt use that territory and neighbouring islets in their future operations. It is a great pity that Australia has not participated in the lucrative business of the South Polar whale and seal fishery, which has yielded to a foreign nation such material wealth for several years, besides providing employment for many people. Obviously this Antarctic whale fishery is a great industry to attract our Scandinavian friends from the shores of Norway to the opposite side of the globe. But they are born and bred to the life, and after all it is the dollars that tell. Australians are easy-going in such matters, and are too much occupied in their industrial squabbles to think of sharing in the wealth that lies at their very doors, so why should these southern whalers care, so long as they can hold the field free from competition and secure in their own rights?

Strange is it not how human affairs prosper by foresight and how readily they are apt to decline under indifferent management? In 1925, the Committee of Experts of the League of Nations estimated the average number of whales killed in the Antarctic every year to be not less than 15,000 and sometimes as many as 20,000; the total number being tentatively put down at 100,000 or 120,000 full-grown whales. In the 1927-28 season it was reckoned that the three Norwegian vessels operating in the Ross Sea took probably £1,000,000 worth of oil and slaughtered about 1,000 whales. In 1924, the Tronsberg Whaling Company, operating in South American waters of the Pacific, made a net profit of 2,958,120 crowns. Its shareholders were paid 50 per cent. on their capital, and the balance of 1,038,120 crowns went to the reserve. There is also an Argentine company making similar profits. While realising that the matter is an international question, and should be considered by the League of Nations, there can be no doubt but that the extermination of the whales and seals is being rapidly brought about by the modern methods employed in the industry and without any material advantage to this country. Surely Australia should participate in the commercial products of a region adjacent to her shores and to which by right of position she is justly entitled!

ANTARCTICA THE SOURCE OF SEASONAL AND CLIMATIC CHANGES IN THE SOUTHERN HEMISPHERE.

By Dr. J. P. Thomson, C.B.E.*

In my Presidential address to this Royal Geographical Society at the Anniversary Meeting in July, 1895, and published in our "Journal" for that year, I postulated the view that the Australian climate is influenced by the Antarctic ice-drifts and associated circulation of the South Polar air and ocean currents, the subject being more recently revived in my lecture to the Constitutional Club in 1927. The idea had occurred to me in earlier life when observing and studying the movements of enormous floating ice-masses in high southern latitudes, and since then it has gained strength with the passing years. It seemed to me reasonable that the great body of salt water which surrounds the land, covering nearly three-quarters of the globe, must have a controlling influence on the smaller habitable surface of only one-fourth of the whole. This I apprehend accords with the Universal Cosmical law of gravitational force and action on liquid and solid matter, which cannot be disputed. And if with this conception we consider the ocean currents, the various densities and temperatures of their waters, and the influence they exercise on the condition of the circulating atmosphere, there can be little doubt in the mind that our climatic and seasonal changes are affected to an extent hitherto unsuspected and not realised. Indeed, until quite recently, the subject was largely speculative and to those of limited vision will probably appear so still. However, in view of its importance, it was decided to have the theory tested by actual observations at all practicable. And following my said address to the Constitutional Club, the Council of this Society urged the Federal Government to take steps to establish meteorological stations on the outposts of the Antarctic Continent nearest to Australia, for the purpose of carrying out observations on the conditions and movements of icebergs and icefields, believed to profoundly influence the climate of this country, particularly in regard to rainfall and recurring droughts, it being held that such observations are essential to

* Address at the Forty-fourth Annual General Meeting of the Royal Geographical Society of Australasia, Brisbane, 7th August, 1929.

long-range seasonal forecasting, in the interests of the pastoral and agricultural life of the Commonwealth at large and should therefore be undertaken as a National enterprise.

In taking this action the chief purpose was (*a*) to prove by actual extended observations the truth or otherwise of the theoretical view of the subject so long advanced; and (*b*) to serve the interests of science generally and of the Commonwealth by exploring every avenue likely to give relief in times of great national stress, such as the country has experienced during disastrous droughts and will undoubtedly experience in the years to come.

From the national viewpoint it cannot be claimed that the position of Australian meteorology is satisfactory. Outside the range of the usual daily weather reports, its value to the pastoral and agricultural life of the country is merely nominal, and until timely long-range seasonal forecasts are issued from the Central Weather Office, it will continue to be so.

It would be difficult to accurately estimate the appalling losses in stock and the setback to rural settlement generally during the recent drought, over practically the whole of Australia; and history records that similar conditions have been experienced at intervals from the early pioneering days. And not only are whole flocks and herds completely eliminated at such times, but one of the most serious features of the drought enemy is experienced in its blighting influence on the quality of meat as compared with the beef grown on the succulent grasses of the Argentine Pampas, as noticed by Mr. Donald Gunn when visiting that country. It will thereby be seen that the aggregate national loss through drought visitations is not only ruinous to the pastoralist and agriculturist, but even its anticipation retards the rural development of the country at large to an extent impossible to fully realise or even estimate.

Considering that meteorologists have for long recognised that Antarctica is "one of the world's centres of action," it is surprising that its influence on climate and seasonal changes has not yet been investigated. The variations in the seasons and associated climatic and general atmospheric changes in the Polar regions do not seem to have been fully realised or understood. Even now, after years of adventure in high southern latitudes, few realise that Antarctica has an area almost equal to Europe and Australia combined, with a coast line of approximately 14,000 miles.

Ross succeeded in proving that a large zone of permanently low pressure exists within the confines of this vast continent. But

it was left to Clement L. Wragge to visualise the possibilities of this region as a field of meteorological importance, for it was that remarkable enthusiast who urged the extension of the Queensland weather service to "high southern latitudes," many years ago, believing that the great "Antarctic depression" influences largely the weather of Australia. Wragge laid it down as a *sine qua non* to the proper understanding and interpretation of the conditions of Australian weather that it is absolutely imperative to look farther afield than our own country.

Wragge's methods, although perhaps picturesque, were certainly progressive, and had he continued the work of his Queensland office the status of Australian meteorology would have doubtless been on a higher plane than it is to-day, and probably the art of long-range seasonal forecasting would have greatly advanced under his enlightened direction. To-day it is just as it was at the beginning of British settlement in this country.

Happily it may be said with reasonable confidence that it will not much longer remain so. For former speculation concerning the cause of marked seasonal changes must give place to the actualities of practical research. And in this the epochal results of Scandinavian laboratory work must rank as of first importance, as recently disclosed by the Swedish oceanographer, Dr. Otto Petersson, who, after forty-five years' investigation, based upon the hydrographic observations of Nordenskjold's "Vega" Expeditions, and later the "German Meteor" Expedition, shows conclusively that the Antarctic shelf is the cradle of all world-wide disturbances in the current system of the globe. Here the stupendous outbursts which occur from time to time in the immense ice-barriers of the South Polar regions, and which have no parallel elsewhere on the earth's surface, are now found to control our climatic and seasonal changes, with their attendant consequences of paralysing droughts and floods.

The regions where ice-melting on a grand scale goes on are identified as real centres of action denoting the seats of origin of the current system of the ocean. These centres of action lie at the northern limit of the drift of Antarctic ice floes (between 40 and 50 deg. South), and on the border of the South Polar ice barrier (70 and 80 deg. latitude), where the icebergs of the Southern Ocean originate. Here changes in the régime of the oceanic circulation take place and influence the climate of the continents bordering on the South Atlantic, the Indian, and Pacific Oceans to a higher degree than hitherto realised or even suspected. The outer part of the Ross Antarctic ice-barrier is in a floating

condition and this bursts at certain periods, when submarine waves of warm and salt deep water, with enormous amplitudes, impinge upon the shelf at the spring tide of the paralactic tide. It is to enable these profound changes to be observed and recorded over a number of years that *the establishment of meteorological stations in Antarctica is essentiol and of the first importance.* Happily the need of this is being recognised by the Commonwealth Government, by the appointment of a New Zealand meteorologist on the staff of the British-Australian Antarctic Expedition, under the leadership of Sir Douglas Mawson. And the same line of research has already been taken up by Sir Hubert Wilkins. In outlining his programme the latter says, "By continuous observations," at the stations which he plans to establish, "it is hoped to co-ordinate Antarctic weather conditions with those observed simultaneously in Australia, New Zealand, South America, and South Africa, and establish a sounder basis for long-range weather forecasts."

He considers the science of meteorological forecast has been through the ages one of the most absorbing occupations of humanity and its possibilities—the prevention of suffering from unexpected droughts and subsequent famine—are humane in the extreme and its economic advantages enormous. It has been his desire to foster the development of Polar meteorology by making it feasible to carry out a series of prolonged investigations at a number of stations in Polar regions for several years. By these it should be possible to forecast whether the seasons will be early or late, wet or dry.

Proceedings of the Royal Geographical Society of Australasia (Queensland).

FORTY-FOURTH ANNUAL GENERAL MEETING AND CONVERSAZIONE, 7th AUGUST, 1929.

His Grace Archbishop Duhig, D.D., F.R.G.S.A., President, in the chair.

There was a large and representative attendance.

The minutes of the previous meeting of the Society were taken as read.

The Hon. General Secretary and Treasurer then read his Report and Financial Statement for the year 1928-29 (pages 91-95). On the motion of Mr. A. Hertzberg these were adopted unanimously.

The officers and Council were then elected for the Session 1929-30. (See back of title page.)

This having concluded the business of the meeting, refreshments were served.

Short musical and vocal selections were provided by Mr. Stefan and Madam de Polotynski.

ANNUAL SUMMARY 1928-29.

The forty-fourth year of the active life of the Royal Geographical Society of Australasia in Queensland was officially brought to a close on the 30th June, 1929, and this usual report of the sessional programme is now submitted to the members, as on former similar occasions, for their information and approval.

In common with similar bodies all the world over, death claims its toll as time passes, and in this regard the Society mourns the loss of several highly valued and widely esteemed supporters who have passed away since the last Anniversary Meeting. These include the Hon. J. G. Appel, Alderman T. S. Barstow, Mrs. M. Cullen, Hon. W. N. Gillies, J. H. Hart, J. W. Hetherington, T. Morton, F. H. Needham, George J. Page, J. Shannon, Lady Nelson (Hon. Member), and Bishop Trower (Hon. Corresponding Member).

The numerical strength of the Society has been well sustained during the session under review, the number of new members added to the roll (50) being greater than for many previous years. At present there are over 600 members of all ranks, and the number is increasing monthly. The Council are always glad to welcome new supporters and additions to the ranks from time to time, and it is hoped that every effort will be made by friends and well-wishers to make known the privileges of membership as widely as possible, so as to still further increase the strength and usefulness of the Society.

The session just closed has been notable for greater activity at headquarters than has usually been the case for some considerable time in the past history of the Society. The monthly meetings have been largely, in point of fact exceptionally well, attended, and the addresses given were important and of wide interest. They include the following subjects, taken chronologically:—

(1) *Captain Arnold Wienholt,* on "Lion Hunting in Central Africa," given to the Cairns and Townsville Branches in July, 1928;

(2) *Dr. J. P. Thomson,* on "Torres Strait and the Jubilee of Thursday Island," to the Warwick Branch;

(3) *Thomas Welsby,* on "Early Moreton Bay and the Naming of its Chief Islands";

(4) *W. Wynne Williams,* on "The Northern Territory—Geographic and Economic, and its Relation to Queensland";

(5) *Prof. F. W. S. Cumbrae-Stewart, K.C., D.C.L., B.A.,* on "Ceylon in 1928";

(6) *Brig.-General C. H. Foott, C.B., C.M.G., A.D.C.*, on "The Influence of Geography on War";

(7) *J. T. Mathewson*, on "Tibet by Picture and Story";

(8) *His Grace Archbishop Sharp, D.D.*, on "Impressions Gathered from Eleven Years' Experience in Papua."

(9) *J. W. Bleakley*, on "The Problem of the Australian Aborigine."

Most of these addresses were illustrated by lantern-slide pictures, screened by the Hon. Lanternist, Mr. H. W. Mobsby.

Being particularly desirous of stimulating interest in the work of the Provincial Branches of the Society, the President (His Grace Archbishop Duhig) accompanied by the Hon. General Secretary (Dr. J. P. Thomson) visited Cairns, Townsville, and Mackay during the current month and delivered his popular lantern lecture "Through Europe and America," to the Branches there. In Cairns the eminent lecturer was accorded a civic reception as President of the Society, the function being held in the large Shire Hall, which was filled by the local authorities and other representative citizens from far and near.

Only for the late hour of arrival at the other centres, it was stated that similar honour and high regard would have been shown His Grace by all classes of the local community. This was evidenced by the applause and enthusiasm with which he was greeted when on the platform.

The lecture was eminently successful at all three places and cannot fail to add to the prestige of the Society at large. It will certainly stimulate local interest in the movement and promote the study of Geography. At each centre the large lecture hall was taxed to its utmost capacity with an attentive, appreciative, and distinguished audience representing the intellectual, commercial, and public life of the city and district; many notable visitors from the Southern States of the Commonwealth were also present, and afterwards expressed appreciation of the opportunity afforded. Although the public halls placed at the disposal of the Society for the lecture were very large and centrally situated, quite a number of people were unable to find accommodation, and had to stand at the entrance or in the passages.

From start to finish it may be said without hesitation that the movement constituted a record in the provincial work of the Society, for on no other occasion in the history of the branches, going back to the early days of the first session at Warwick and Toowoomba (in which His Excellency the Governor, Sir Herbert Chermside, actively participated), has such interest been shown by the people. This was evidenced in a practical manner by the enrolment of new members.

Since last Annual General Meeting the interest in South Polar Exploration and Research has greatly increased, chiefly owing to the expedition sent out under the leadership of Commander Byrd and Sir Hubert Wilkins from America; and more recently—thanks to the action of the Commonwealth Government—an expedition will shortly leave for the far south commanded by Sir Douglas Mawson.

In view of the steps taken by the Council urging the Federal Government to establish Meteorological Stations in Antarctica, the movements of the forthcoming Mawson Discovery Expedition will be followed with special interest by the Royal Geographical Society of Australasia.

The usual financial statement, duly audited, is herewith submitted, showing the credit balance of the current account to be £75 7s. 3d. on the 30th June, 1929.

The amount standing to the credit of the endowment fund is £127 0s. 11d.

Attention to the interests of the Provincial Branches, coupled with the working expenses at headquarters and heavy printing costs, must always be a heavy drain on the general funds of the Society, consisting of the voluntary contributions of its members, although the strictest economy is practised in the management and direction of its business, sometimes to the extent of making the liquidation of an official obligation a personal matter. The financial position could, however, be improved by increasing the membership roll, and this is one of the surest roads to success.

Repeating the remarks made in the previous report, "that, in view of the important work of the Society and its position as a recognised National Institution, it cannot but be said that the endowment fund, composed mostly of voluntary donations, is at present insignificant, still many big things have arisen from small beginnings, and may it not be hoped that some generous donors will recognise the value of our work as being not unworthy of greater support."

With the view of encouraging the study of Geography in Secondary Schools, the President and Council have decided to offer a prize, to be called the "Thomson Prize" of the Royal Geographical Society of Australasia (Queensland), for the best essay on such subjects as may be named from time to time. First prize: Gold Medal; Second prize: Silver Medal; Third prize: Certificate.

First Essay—Matthew Flinders: Explorations and Discoveries; not to exceed 1,000 words.

In conclusion, the Council recommends—

(1) The reappointment of Mr. A. S. Kennedy (Fellow) as Honorary Auditor, and Mr. H. W. Mobsby (Fellow) as Honorary Lanternist;

(2) That in accordance with the Rules, the Honorary Diploma of Fellowship be conferred upon—(*a*) The Right Honourable S. M. Bruce, Prime Minister and Vice-Patron of the Society, in recognition of the great services rendered by his Administration to the advancement of Geographical Science in the Commonwealth of Australia, particularly by the financial support afforded in the recent scientific investigation of the Great Barrier Reef, inaugurated exclusively by the Royal Geographical Society of Australasia (Queensland), and lately in organising an Exploration Expedition to investigate the Meteorological and other Geographical problems of Antarctica, considered to have an important bearing on seasonal and climatic changes; and Dr. Eric Mjöberg, Honorary Corresponding Member of the Society and Director of the Sarawak Museum, Borneo, Explorer and Author; (*b*) Also that the Fellowship available to subscribing members be awarded to Mr. Samuel Hannaford, of Warwick and Stanthorpe, Life Member of the Society and Early Pioneer Explorer of the Great Nullabor Plain and Great Australian Bight; and to Mr. J. D. Steele, formerly Pioneer Staff Surveyor,

Queensland, and a highly esteemed Member of the Society. It is also recommended that Mr. Einar Lindquist, Swedish Consul-General for the Commonwealth of Australia and the Dominion of New Zealand, be appointed an Honorary Corresponding Member of this Society.

To the Queensland Government for assistance and encouragement in the work of the Society; to the Assistant Secretary (Mrs. Graham); to Messrs. Hugh Macintosh and Inigo Jones, who have held the position of Joint Honorary Librarians during the Session; and to all those who have otherwise assisted in the sessional work, cordial thanks are tendered, particularly to Miss Kathleen Graham and Mr. Stefan de Polotynski for arranging and putting in order the Reference Library.

Approved by the Council.

J. DUHIG, President.

5th August, 1929.

STATEMENT OF ACCOUNTS.

From 1st July, 1928, to 30th June, 1929.

	£	s.	d.
Dr.			
By Balance in Commonwealth Bank	63	5	10
„ Subscriptions Received	258	6	0
„ Interest on Savings Bank Account	3	4	5
	£324	16	3
Cr.			
To General Printing	21	4	6
„ Advertising and Branch Expenses	14	12	0
„ Expenses Meetings, Headquarters	31	7	9
„ Post Cards for Meetings and Lectures, including Branches ..	21	0	0
„ Typing and Clerical	7	7	7
„ General Postage, including Branches	17	1	10
„ Telephone Charges and Incidentals	19	19	11
„ Travelling Expenses on Branch Business	10	0	0
„ Hon. Treasurer	103	15	0
„ Insurance Premium	2	15	5
„ Exchange on Cheques, &c.	0	5	0
„ Balance in Savings Bank	75	7	3
	£324	16	3
By Contribution to Capital Fund	122	5	6
„ Interest	4	15	5
	£127	0	11

Examined with Vouchers, Bank Pass Book, &c., and found correct.

A. S. KENNEDY, Hon. Auditor.

4th July, 1929.

J. P. THOMSON, Hon. Secretary and Treasurer.

Examined and approved by the Council.

J. DUHIG, President.

5th August, 1929.

PROVINCIAL BRANCHES.

Bundaberg Branch.—Chairman: Hon. Sec.

Cairns Branch.—Chairman: F. C. Hodel, Esq., J.P. Hon. Sec.: Mr. Lionel Draper.

Gympie Branch.—Chairman: F. B. Sykes, Esq. Hon. Sec:

Ipswich Branch.—Chairman: R. A. Kerr, Esq., M.A., B.Sc. Hon. Sec.: Miss A. Douglas Brown.

Mackay Branch.—Chairman: W. A. Amiet, Esq., M.A. Hon. Sec.:

Maryborough Branch.—Chairman: Hon. A. Dunn. Hon. Sec.:

Rockhampton Branch.—Chairman: W. H Rudd Esq. (Fellow). Hon. Sec.:

Toowoomba Branch.—Chairman: Dr. T. A. Price. Hon. Sec.: A. A. R. Boyce, Esq., C.B.E., F.R.G.S.

Thursday Island and Torres Strait Branch.—Chairman: A. Broadbent, Esq. Hon. Sec.: Dr. G. H. Vernon, M.C., F.R.G.S.A.

Townsville Branch.—Chairman: H. Horn, Esq. Hon. Sec.: P. F. Rowland, Esq., M.A.

Warwick Branch.—Chairman: J. J. Kidner, Esq. Hon. Sec.: W. A. Millward, Esq.

THE THOMSON FOUNDATION GOLD MEDAL.

Awards.

The Thomson Foundation Gold Medal of the Royal Geographical Society of Australasia (Queensland), established in 1900 in honour of Dr. J. P. Thomson, the Founder of the Society, shall be awarded annually, or at such other times as the Council may approve, to the author of the best original contribution to Geographical Literature, provided it be of sufficient merit, approved and accepted by the Council. Special awards of the Medal may also be made from time to time to such persons as have gratuitously rendered eminent services to the Society. (*See back cover.*)

The following are the names of the recipients of the Medal, the grounds of the award being noted only briefly here, but are given more fully in the "Journal," to which reference is hereafter made:—

1901—**Dr. J. P. Thomson,** for his great services to Geographical Science. *Vide* "Queensland Geographical Journal," vol. xv., pp. 133-134; vol. xvi., pp. 132-135, 141-142.

1906—**Sir Hugh M. Nelson,** for his valuable services to the Society. *Vide* "Queensland Geographical Journal," vol. xxi., p. 151.

1910—**Sir Arthur Morgan,** for valuable services rendered to the Society. *Vide* "Queensland Geographical Journal," vol. xxv., p. 144.

1917—**Dr. T. Griffith Taylor,** for "Thesis on the Settlement of Tropical Australia." *Vide* "Queensland Geographical Journal," vol. xxxii.-xxxiii., p. 1.

1920—**Major Sir Hamilton J. Goold-Adams,** for valuable services to the Society as President. *Vide* "Queensland Geographical Journal," vol. xxxiv.-xxxv., p. 69.

1921—**Hon. W. F. Taylor, M.D.,** for valuable services to the Society. *Vide* "Queensland Geographical Journal," vol. xxxvi.-xxxvii., p. 99.

1925—**Sir Matthew Nathan,** for signal services rendered to the Society during his term of office as President, 1920-26. *Vide* "Queensland Geographical Journal," vol. xl.-xli, p. 128.

1928—**Bert Hinkler,** for his service to the science of Aviation by his flight from England to Australia, 1928.

THE THOMSON PRIZE OF THE R.G.S.A.

With the view of encouraging the study of Geography in Australian Secondary Schools, the Council of the Royal Geographical Society of Australasia has decided to offer a prize, to be called the Thomson Prize, for the best original Essay on such subjects as may be named from time to time.

First Prize, Gold Medal; Second Prize, Silver Medal; Third Prize, Certificate.

Subject for First Essay: "Matthew Flinders; Explorations and Discoveries."

Essay should not exceed 1,000 words.

JAMES DUHIG, President.

F. J. MORGAN.

DIPLOMAS OF FELLOWSHIP.

The following gentlemen have been awarded the Diploma of Fellowship under Section IV. of Clause 3, Constitution and Rules (*see page 2 of cover*):—

H.R.H. the Prince of Wales, K.G., &c.

The Right Hon. Lord Lamington, G.C.M.G., G.C.I.E., B.A., F.R.G.S., Hon. F.R.S.G.S., &c.

The Right Hon. Viscount Novar of Raith, G.C.M.G., LL.D.

His Excellency the Rt. Hon. Lord Stonehaven, G.C.M.G., D.S.O., F.R.G.S., Governor-General and Patron.

The Right Hon. S. M. Bruce, C.H., M.C., C. de G., LL.D., D.C.L., &c., Prime Minister and Vice Patron.

His Grace Archbishop Duhig, D.D., President.

His Excellency Hon. Sir J. H. P. Murray, K.C.M.G.

Professor J. W. Gregory, D.Sc., F.R.S., Geological Department, University, Glasgow, Scotland.

Dr. Eric Mjöberg, Director, Sarawak Museum, Borneo.

Clifford H. Hay, Esq., C.M.G., M.V.O., Secretary, Premier's Department, Sydney, N.S.W.

J. C. Cartledge, Esq.
Alexr. Corrie, Esq., J.P.
B. Dunstan, Esq.
E. E. Edwards, Esq., B.A.
F. B. C. Ford, Esq., J.P.
S. Hannaford, Esq.
L. C. Horton, Esq., J.P.
A. S. Kennedy, Esq.
R. H. Matthews, Esq., L.S., J.P., &c.
H. W. Mobsby, Esq., F.R.S.A.
W. H. Rudd, J.P.
A. A. Spowers, Esq., J.P., &c.
J. D. Steele, Esq., J.P.
Capt. W. C. Thomson
Dr. G. H. Vernon, M.C.
A. D. Walsh, Esq., J.P.
Capt. Arnold Wienholt, D.S.O., M.C.
W. A. Wilson, Esq.

LIST OF MEMBERS.

(P) Members who have contributed papers which are published in the Society's "Journal." The numerals indicate the number of such contributions.

(PP) Past President.

A dagger (†) prefixed to a name indicates a member of the Council.

Life members are distinguished thus (*).

Should any error or omission be found in this list, it is requested that notice thereof be given to the Hon. Secretary.

Foundation Members.

P1 Allardyce, His Excellency Sir Wm. L., K.C.M.G., Govt. House, St. Johns, Newfoundland.
d Alton, R., Brisbane.
d Armour, R. L., J.P., Brisbane.
d P1 Atkinson, J. R., L.S., Ipswich.

d Bailey, T. S., Survey Department, Brisbane.
d P1 Bartley, N., Brisbane.
d Bell, W., Supreme Court, Brisbane.
d P1 Bennett, E. J., Survey Department, Brisbane.
d Brydon, J. M., J.P., Brisbane.

d Coghlan, J., Mount Eagle, Cooyar.

d Daniell, E. N., Survey Department, Brisbane.
d Davidson, W. M., Deputy Surveyor-General, Brisbane.
d Drury, E. R., C.M.G., General Manager, Q.N. Bank, Brisbane.

d Ferguson, J., J.P., Brisbane.
d Foxton, Hon. J. F. G., Brisbane.
Fraser, T., L.S., Brisbane.

d Gailey, R., J.P., Brisbane.
d P9 PP Gregory, Hon. Sir A. C., K.C.M.G., M.L.C., F.R.G.S., &c., Brisbane.

d Heath, G. P., J.P., Comm. R.N., Brisbane.
d Heeney, F. X., J.P., Lands Department, Brisbane.
P1 Hennessy, Capt. J. M., New Guinea.
Hoggan, R., B.A., Survey Department, Brisbane.
d P1 Hull, A. A., L.S., Survey Department, Brisbane.

d Langford, W. H., Survey Department, Brisbane.
Lavarack, Major C. W., Survey Department, Brisbane.
P1 Leonard, G. A., L.S., Yorick Club, Collins Street, Melbourne.
d Lilley, Hon. Sir Charles, Kt., Chief Justice, Brisbane.
Lloyd, W. M., J.P., Brisbane.
Luck, H. C., F.R.G.S., J.P., Commercial Travellers' Club, Elizabeth Street, Brisbane.

---

d Known to be dead.

LIST OF MEMBERS—*continued.*

d Macpherson, Hon. P., M.L.C., Brisbane.
Marks, Hon. C. F., M.D., M.L.C., FELLOW, Wickham Terrace, Brisbane.
d McDonald, G. T., L.S., Rocklea.
d McDonnell, E., J.P., Brisbane.
d McDonnell, J., J.P., Brisbane.
d McMaster, J., M.L.A., Brisbane.
d Mein, His Honour Mr. Justice C. S., M.A., Brisbane.
P2 PP Miskin, W. H., Brisbane.
P1*Moore, T. B., F.R.S., Tas., New Norfolk, Tasmania.
d Morehead, Hon. B. D., M.L.A., Brisbane.
d P1†Muir, A., J.P., FELLOW, "Menzies," Brisbane.
d Muir, J., J.P., Brisbane.

O'Connor, T., L.S., "Duporth," Oxley, Brisbane.

d Persee, T. K., Survey Department, Brisbane.

Raff, H., L.S., Brisbane.
P1 Romilly, Hon. H. H., Port Moresby, New Guinea.
Russell, H. H. A., Immigration Department, Brisbane.
d Ryan, R. A., J.P., Brisbane.
d Stanley, F. D. G., F.R.S.B.A., Brisbane.
d P1 PP Stodart, J., FELLOW, Market Street, Brisbane.

d Thomson, John, M.B., &c., Brisbane.
P43 PP*Thomson, J. P., C.B.E., LL.D., Hon. F.R.G.S., &c., Hon. Sec. and Treasurer, Brisbane.
Trower, H., Survey Department, Brisbane.
d Tully, W. A., B.A., F.R.G.S., Surveyor-General, Brisbane.

Viner, A. J., Brisbane.

d P1 PP Waugh, J. N., M.D., Brisbane.
d Williams, W., J.P., Brisbane.
d Wilson, R. W., J.P., Brisbane.
d Wilson, W. H., Brisbane.
d P1 Woolnough, Rev. G., M.A., Brisbane.
d Wright, H. T., Comm. R.N., Brisbane.

Members.

Adam, C. H., Messrs. W. Adam & Sons, Maryborough.
Adams, J. L., Thursday Island, Torres Strait.
Adams, Mrs Jane, Henley Park, near Yalleroi.
Aldous, A. E., c/o Howard Smith and Co., Ltd., Eagle Street, Brisbane.
Alexander, Arthur S., Messrs. Alexander & Walker, Maryborough.
Allan, David Muir, Walker Avenue, Teneriffe, Brisbane.
Amiet, W. A., M.A., Barrister and Local Chairman, Sydney Street, Mackay.
Anderson, Alderman J., Warwick
Annand, His Worship Alderman J. D., M.L.A., Toowoomba.
Armati, G. V., P. V. Armati & Son, Alexandra Street, Townsville.
Armati, P. E., Sydney Street, Mackay.

LIST OF MEMBERS—*continued.*

Ash, Rev. F. L., Albert Street Rectory, Mackay.
Atherton, Hon. E. A., M.L.A., Mines Department, Brisbane.
P1*Austen, L., Buna Bay, *via* Samarai.
Austin, Rev. A. H., M.A., The Manse, Hunter's Hill, Sydney, N.S.W.

Bagley, C., Mackay.
Bain, J., Exhibition Grounds, Bowen Hills, Brisbane.
Baker, Fred, Commission Agent, Bundaberg.
Bardsley, G. H., "Hughenden," Logan Road, Coorparoo, Brisbane.
Barker, Miss E. J., B.A., Infants' School, Fortitude Valley, Brisbane.
Barlow, Frank H., City Engineer, Town Hall, Toowoomba.
Barnard, Chas. A., Coomooboolaroo, *via* Duaringa.
Barnes, F. C., "Everest," Chaseley Street, Auchenflower, Brisbane.
Barnes, G. P., M.L.A., Palmerin Street, Warwick.
Barnes, J. H. S., Canning Downs, Warwick.
Barnes, Hon. W. H., M.L.A., Vice-President, Milsom Street, Coorparoo, Brisbane.
*Barrett, Mrs. Walter, Eagle Junction, Brisbane.
Baynes, Ernest, Montpelier, Wickham terrace, Brisbane.
*Beattie, Miss E. J., Girls' State School, Toowoomba.
Beckenham, C. H., Aust. Bank of Commerce, Mackay.
Beeran, G. V., Townsville.
†Bell, E. T., M.L.A., Kitchener Road, Clayfield, Brisbane.
Bell, L. C., The Armidale School, Armidale, N.S.W.
†Bertram, Hon. W., Lytton Road, Brisbane.
Biggs, J. E., Perkins and Co., Mary Street, Brisbane.
Black, Archie L., Victoria Street, Mackay.
Black, Fred, senr., Alfred Street, Mackay.
Bodleian Library (The Librarian), University of Oxford, c/o Parker and Son, 27 Broad Street, Oxford, England.
Boland, James, Cairns, Queensland.
Booth, O. I., Messrs. Gobbett and Booth, Ruthven Street, Toowoomba.
Boyce, A. A. Rodney, C.B.E., F.R.G.S., Local Hon. Sec., "Bona Vista," Rangeville P.O., Toowoomba.
Brain, L. J., Flight Capt., Hamilton Road, Hamilton, Brisbane.
Brannelly, P. M., c/o Walter Reid and Co., Rockhampton.
Broadbent, A., Local Chairman, Thursday Island, Torres Strait.
Broe, J. M., Head Teacher, State School, Cannon Hill, Brisbane.
Brookes, G. B., Agnes Street, Range, Rockhampton.
Brooks, A. E., Architect, 85 Adelaide Street, Brisbane.
Brown, Dr. E. E., Brisbane Street, Ipswich.
Brown, E. S., "Dawnie," Range, Toowoomba.
Brown, H. E., Ruthven Street, Toowoomba.
Brown, J. Leonard, J.P., "Woggonora," Cunnamulla.
Brown, Miss A. Douglas, Local Hon. Sec., "Oakdale," Brisbane Street, Ipswich.
Brown, Miss M., B.A., Principal, Glennie School, Toowoomba.
Browne, Major-General R. Spencer, C.B., F.R.G.S., c/o The Brisbane Newspaper Co., Ltd., Brisbane.
Buhôt, E. W. J., Health Department, South Brisbane.
Burns, W. A., c/o Cairns Timbers Limited, Post Office Box 107, Cairns.

LIST OF MEMBERS—*continued.*

Burns, William, c/o Messrs. Burns and Twigg, Rockhampton.
Buss, G. A., Planter, Bourbong Street, Bundaberg.
Byrne, Rt. Rev. Monsignor Lord Bishop, Toowoomba.

Calvert, Thomas, J.P., Box 67, Proserpine.
Cameron, Colin, Foundry, Victoria Street, Mackay.
Cameron, Colonel D. C., C.M.G., D.S.O., M.P., Vice-President, Federal Members' Room, G.P.O., Brisbane.
Cameron, G. M., Mackay, Queensland.
Cameron, W. H., Mackay, Queensland.
*Campbell, A., J.P., Glengyle Station, Birdsville.
Campbell, G. P., Messrs. Jas. Campbell and Sons, Ltd., Creek Street, Brisbane.
Campbell, Rev. R. S., The Rectory, Albert Street, Mackay.
Campbell, Victor F. J., Messrs. Jas. Campbell and Son, Ltd., Creek Street, Brisbane.
Carey, J. J., senr., Rankin and Carey, Merchant, Gympie.
Cartledge, John Colenso, FELLOW, c/o P.O. Box 775, Durban, Natal, South Africa.
Chadwick, Wm. Arthur, Ocean House, Martin Place, Sydney, N.S.W.
Chenoweth, Dr. Ern, District Hospital, Mackay.
Cherry, Miss P., Girls and Infants' State School, Mackay.
Chippindall, A. H., Chemist, Bundaberg.
Christopherson, M. C. J., Peters' Arctic Delicacy, Upper Melbourne Street, South Brisbane.
Christsen, H. T., Merchant, Bourbong Street, Bundaberg.
Clark, James, Union Bank Chambers, Queen Street, Brisbane.
Clark, Robert, Central Mill, Pleystowe, Mackay.
Clarke, Dr. P. S., Abbott Street, Cairns.
Clarke, G. H., J.P., c/o Hodels, Ltd., Thursday Island, Torres Strait.
Collin, Capt. W. J., W. Collin and Sons, Ltd., Adelaide Street, Brisbane.
*Collins, Mrs. R. M., "Tamrookum," Beaudesert.
Collins, Ald. W. A., Chemist, Cairns.
Colwell, Rev. James, F.R. Hist. S., 4 Dover Road, Rose Bay, Sydney, N.S.W.
Comino, George Emanuel, Abbott street, Cairns, Queensland.
*Comino, T. S., Upper Kennedy Terrace, Paddington, Brisbane.
Connolly, Dr. T. P., Russell Street, Toowoomba.
Cook, A. A., Greenmount, Mackay.
Copas, Miss A. M., Girls' Grammar School, Rockhampton.
Corlass, E. J., c/o Pumping Station, Mount Crosby, *via* Ipswich.
Corran, Ald. A., Thursday Island, Torres Strait.
*Corrie, Alex., J.P., FELLOW, Parbury House, Eagle Street, Brisbane.
Costello, Major E., M.L.A., Parliament House, Brisbane.
Costin, T. J. F., Ph.C., M.P.S., 336 George Street, Brisbane.
Cramond, D., Ruthven Street, Toowoomba.
Cranley, J. P., Produce Merchant, Turbot Street, Brisbane.
Crawford, B. T., F.C.P.A., Public Accountant, Union Bank Chambers, Queen Street.
Crawford, J. J. R., Sub-Collector Customs, Thursday Island, Torres Strait.

LIST OF MEMBERS—*continued.*

Cribb, H. S., Messrs. Cribb & Foote, Ipswich.
Croker, James, Barry House, Victoria Street, Mackay.
*Crorkan, T., J.P., ————
Cross, D. W., c/o Burns, Philp, and Co., Townsville.
Crowther, A. J., General Manager, Railway Department, Townsville.
Crowther, S., J.P., Glan Osmond Avenue, Camp Hill, South Brisbane.
Crunkhorn, W. H., Nebo Road, Mackay.
Cullinane, J. A., Mary Street, Gympie.
P1 Cumbrae-Stewart, Prof. F. W. S., K.C., D.C.L., B.A., The University of Queensland, Brisbane.
Cumming, A. J., Government Printer, Brisbane.
Curlewis, F. C. P., Hambledon, via Cairns.
Curr, C. M., "Ruwenzori," Rosehill, Warwick.
Curran, Mrs. Margaret, Wallace Street, Newtown, Toowoomba.
Cussens, T. W., Pearler, Thursday Island.

Davenay, M. B., Palmerin Street, Warwick.
Davie, Charles, Anvil Stores, River Street, Mackay.
Davies, A. O. C., Education Department, Thursday Island.
P1 Davies, His Lordship Rt. Rev. S. H., Bishop of Carpentaria, Thursday Island.
Dawson, T. W. G., The Scots College, Victoria Road, Belle Vue Hill, Sydney, N.S.W.
Delaney, W. G., Solicitor, Nicholas Street, Ipswich.
Dent, Dr. R. C., Palmerin Street, Warwick.
Devine, Mrs. A. H., Killowen, East Warwick.
Dixon, A. J., Manager, McKay Ltd., Stanley Street, South Brisbane.
Dobbyn, L. S., Aboriginal Department, Thursday Island.
P1 Done, Rev. J., St. John's Rectory, Bega, New South Wales.
Donnan, R. L., c/o The Union Bank, Queen Street, Brisbane.
Dougherty, Hercules R., C.E., Belfast Street, Yeronga.
Douglas, A. S., ————
Douglas, His Honour Judge, Townsville.
Down, G., J.P., Ward's Chambers, Queen Street, Brisbane.
Dowrie, Messrs. G. and J., Engineers, Merivale Street, South Brisbane.
Draper, Lionel, Hon. Local Secretary, A.M.P. Building, Cairns.
Dreyer, A. N., c/o Mr. J. M. Gibson, Racecourse, Mackay.
Drill, R., Alfred Street, Mackay.
Duhig, Dr. J. V., Wickham Terrace, Brisbane.
P3*Duhig, His Grace the Most Rev. Archbishop, D.D., FELLOW, President, "Wynberg," New Farm, Brisbane.
Dunn, A., Local Chairman, "Chronicle" Office, Maryborough.
Dunn, Miss May, cr. Bourbong and Branyan Streets, Bundaberg.
Dunn, W. H. A., "Toowoomba Chronicle," Toowoomba.
P3†Dunstan, Benjamin, F.G.S., FELLOW, Chief Government Geologist, Brisbane.
Dunstan, Hon. T., Gympie.
Dunwoodie, J. I., Thursday Island, Torres Strait.

P1*Edwards, Edward E., B.A., FELLOW, Telegraph Building, Brisbane.
Effey, William, J.P., Central Buildings, Edward Street, Brisbane.
Egan, Dr. John, M.B., Palmerin Street, Warwick.

LIST OF MEMBERS—*continued.*

Eizenberg, H., Palmerin Street, Warwick.
Ellison, T. A., Surveyor, Survey Camp, *via* Eidsvold.

Fahey, J. T., c/o Railway Goods Office, Roma Street, Brisbane.
Fairfax, J. Hubert, J.P., "Marinya," Cambooya.
Fairlie, James, Messrs. Fairlie and Sons, Maryborough.
Farquhar, J. R., c/o Q.M.E., Lake's Creek, Rockhampton.
Farquhar, T. J., Pearler, Thursday Island.
Ferguson, J. A., B.A., LL.B., 167 Phillip Street, Sydney, N.S.W.
Ferry, Mrs. C. H., Grand Hotel, Mellor Street, Gympie.
Finemore, D. S. M., Dentist, Woongarra Street, Bundaberg.
Fletcher, S. D., Morris and Fletcher, Queen Street, Brisbane.
Flint, Rev. A. C., Mission Station, Lockhart River, North Queensland, *via* Torres Strait.
Florence, Capt., Queensland Pilot Service, Thursday Island, Torres Strait.
*Foote, J. A., J.P., "Warrinilla," Rolleston.
P1 Ford, F. B., FELLOW, "Stanford," Kennedy Terrace, Red Hill, Brisbane.
Fowler, Jas. T., Majisbrake, Buna Bay, Territory of Papua.
Fox, C. L., Oxley, Brisbane.
Frankel, Philip, J.P., "Zonoma," Mark Street, New Farm, Brisbane.
Franklin, A. H., "Morning Bulletin" Office, East Street, Rockhampton.
Fraser, Dr. W. A., M.B., B.S., Boonah.
Fraser, Frank, junr., Ingham.
Freeleagus, Christy, Consul for Greece, Freeleagus Chambers, Edward Street, Brisbane.
Frew, A. E. Harding, B.A., C.E., T. and G. Building, Queen street, Brisbane, and Chelmer.
Frith, Mrs. J. O., "Rodway," Range, Toowoomba.
Furnivall, Percy, Government Teacher, State School, Aramac.

Gallagher, Dr. M. J., Albert Street, Mackay.
Gallagher, Mrs., Albert Street, Mackay.
P1 Galletly, A. M. M., Park Street, East Mackay.
Garrick, T. A., Manager, Olympic Pictures, Bundaberg.
Gataker, M. L., Messrs. Gataker and Sons, Maryborough.
Gaukrodger, D. W., "Waiiti," Windermere Street, Ascot, Brisbane.
Gaylard, William, Education Department, Brisbane.
Geddes, A. J., Caroline Street, Rockhampton.
*Gibson, D. W., Authorised Surveyor, c/o Survey Office, Brisbane.
Gibson, W. G., Bingera, Bundaberg.
Gielis, Walter, Australian Steamships Ltd., Mackay.
Gilchrist, E. F., B.A., M.C.E., City Engineer, Brisbane.
Gillies, R. G., J.P., City Printing Works, Elizabeth Street, Brisbane.
Gipps, F. G. D. V., Mining Engineer, Herberton.
Glissan, A. H., "Taabinga," Jellicoe Street, Toowoomba.
Godsall, Mrs. A. R., Ruthven Street, Toowoomba.

LIST OF MEMBERS—*continued.*

Goldfinch, H. A., Dentist, Cairns.
Gorringe, J. A., Authorised Surveyor, Kempton, Tasmania.
Grace, R. A., Thursday Island, Torres Strait.
Graham, Mrs. Thos., Junction Road, Morningside.
Graham, R. D., Oriamo Oil Co., West Papua.
Graham, Wm. E., Campbell Street, East Toowoomba.
Greene, Miss Alice J. Alison, Principal, Moreton Bay Girls' High School, Wynnum.
Greenaway, Mrs., Wantley Street, Warwick.
Greenham, Dr. Eleanor Constance, Edward Street, Brisbane.
Greensill, E. H. R., C.E., P.O. Box 719K, Brisbane.
Grey, Capt. J. R., c/o Mrs. Buckland Taylor, Grutwiche House, Billinghurst, Sussex, England.
Grey, Mrs. J. R., F.L.S., c/o Mrs. Buckland Taylor, Grutwiche House, Billinghurst, Sussex, England.
Griffin, William Charles, J.P., Somerset Farm, Gordon Vale, near Cairns.
Griffith, A. A., Curzon Street, Toowoomba.
Griffiths, F. A., York Street, Ipswich.
P1†Groom, Hon. Sir L. E., K.C.M.G., M.A., LL.M., M.P., Vice-President, "Unara," Albert Street, Toowoomba.
Gruter, O. J., Dentist, Barolin Street, Bundaberg.
Gunn, Donald, "Boolarwell," Talwood.
Gutteridge, Dr. Noel, Laboratory, Toowoomba.

Hale, E. S., Merchant, Maryborough Road, Bundaberg.
Hall, F. R., Harbour Board Office, Cairns.
Hall, J. S., F.A.I.S., Primary Producers' Bank, Balaklava, South Australia.
Ham, A., State School, Thursday Island.
Hamilton, R. C., B.A., Principal, Technical College, Warwick.
Hanger, T., Principal, High School, Gympie.
*Hannaford, S., J.P., FELLOW, Palace Hotel, Warwick.
Hannah, Miss Isobel, c/o Mrs. J. G. Appel, Clayfield.
Harbord, H. H., J.P., Maytown.
Harmon, D. C., Badu Island, *via* Thursday Island, Torres Strait.
Harper, F. O., Robert Harper and Co., Ltd., 390 Flinders Lane, Melbourne, Victoria.
Harris, W., P.M., and Chairman Railway Appeal Board, Henzell Terrace, Greenslopes.
Hart, Dr. B. L., East Street, Ipswich.
Harvey, J. P., Surveyor-General, Survey Office, Brisbane.
Hawley, Miss, M.P.S., Sydney Street, Mackay.
Hayes, The Rev. Leo, Kilcoy.
Heavey, The Rt. Rev. Lord Bishop, Cairns.
Henderson, G., J.P., "Elmbank," Laidlaw Parade, East Brisbane.
Hennessy, E. J., Pearler, Thursday Island.
Herbertson, Frank, Cane Planter, Windermere, Bundaberg.
†Hertzberg, A., Chairman of Council, Messrs. A. M. Hertzberg and Co., Charlotte Street, Brisbane.
Hertzberg, Marcus, B.A., LL.B., Messrs. A. M. Hertzberg and Co., Charlotte Street, Brisbane.

LIST OF MEMBERS—*continued.*

Hertzberg, Mrs. A. M., 443 Bowen Terrace, Brisbane.
Hill, J. V., Town Clerk, Goondiwindi.
Hillman, J., Victoria Street, Mackay.
Hine, F. C., c/o Luke Fisher, Ltd., 523 Stanley Street, South Brisbane.
Hocking, A. H., Manager, Commonwealth Bank, Stanthorpe.
Hockings, E. M., c/o Messrs. Hockings and Palmer, Denham Street, Rockhampton.
*Hodel, F. C., J.P., Local Chairman, Cairns.
Hodges, A. G., Head Teacher, East End State School, Bundaberg.
Hogarth, R. C., "Clio," Taylor Street, Toowoomba.
*Holt, W. H., F.R.C.I., "Glanwyne," Manly Point, Manly, N.S.W.
Holyoake, W. W., Chemist, Mackay.
Hopkins, Dr. P. W., District Hospital, Mackay.
Hopkins, Spenser, Strand, Townsville.
Horn, Dr. David, B.A., M.B., Ch.B., Ruthven Street, Toowoomba.
Horn, H., Local Chairman, Flinders Street, Townsville.
P1*Horton, Leonard Cecil, J.P., FELLOW, "The Limes," Giru, *via* Townsville.
Hubbard, Rev. Percy, St. Alban's Rectory, Innisfail.
Hughes, C. H., Chemist, Maryborough.
Hulbert, Miss M., Girls' Grammar School, Rockhampton.
Humphreys, T. C., Surveyor, Revenue Office, Singapore.
Hunt, Rev. E. Aldington, Th.L., Church of England School, Toowoomba.
Hunter, R. D., State School, Indooroopilly, Brisbane.
Hurworth, Dr. C. W., M.A.C.D. (Mel.), D.M.D. (Harvard), Toowoomba.
Hutton, Mrs. J. C., Agnes Street, Range, Rockhampton.
Huxham, Hon. John, Qualtrough Street, Woolloongabba, South Brisbane.
*Hyne, H. J., Maryborough.

Innis, Mrs. A., "The Ochils," Sarina, North Coast Line.
Irving, J. Washington, M.R.C.V.S.L., Ann Street, Brisbane.
Irving, W. Edmund, "Lorina," Kirkland Avenue, Coorparoo, Brisbane.
Irwin, Wm., "Daily News" Office, Warwick.

Jackson, Dr. E. Sandford, St. Helen's Private Hospital, South Brisbane.
James, J. P., Q.N. Bank, Esk.
James, W., Q.N. Bank, Toowoomba.
Jarratt, Miss M. K., B.A., Girls' High School, Vulture Street, South Brisbane.
P2 Jensen, Dr. H. I., Roma.
Jensen, Thor. H., Authorised Surveyor, Treasury Chambers, George Street, Brisbane.
John, Erich, 362 George Street, Brisbane.
Johnston, A., Bank of New South Wales, Cairns.
Jolly, A. D., New Zealand Loan and Mercantile Agency Co., Townsville.
Jolly, Rt. Worshipful Alderman W. A., C.M.G., Town Hall, Brisbane.

LIST OF MEMBERS—*continued.*

Jones, Arthur, senr., J.P., Bondoola, *via* Rockhampton.
Jones, G. E., Public Accountant, Victoria Street, Mackay.
Jones, Hon. T. L., Messrs. Foggitt and Jones, Turbot Street, Brisbane.
Jones, Inigo, Bower Street, Gladstone Road, South Brisbane.
Jordan, Rev. Father M., Presbytery, Nundah.
Joyce, R., 228 Elizabeth Street, Brisbane.
Jubb, E. St. V., Ruthven Street, Toowoomba.

Kallinicos, G., Blue Bird Cafe, Flinders Street, Townsville.
Kelly, Rev. Dr. Kevin J., Italian Consular Agent, Ingham.
Kemp, Charles, "Hadleigh," Indooroopilly.
Kempster, Leonard, Farrington Hill, Alderley, Brisbane.
*Kennedy, A., Chesley Street, Auchenflower, Brisbane.
Kennedy, A. L., L. S., Gresham Street, East Brisbane.
Kennedy, A. S., FELLOW, Hon. Auditor, Kingsholme, Fortitude Valley, Brisbane.
Kerr, R. A., M.A., B.Sc., Principal, Boys' Grammar School and Local Chairman, Ipswich.
Kidner, J. J., Local Chairman, National Bank of Australasia, Warwick.
Kingel, Alderman T. W., Mayor, Rockhampton.
King, Hon. R. M., M.L.A., Vice-President, Department of Public Instruction, Brisbane.
Kingsford, F. J., Town Clerk, Warwick.
Kirby, A. R., c/o Messrs. A. W. Kirby, East Street, Rockhampton.
Kirby, Miss E., Guy Street, Warwick.
Kirke, The Rev. G. K., St. Stephen's Church, Ipswich.
Krone, B. H., Principal, High School, Bundaberg.
Kussman, A. A., 229 Adelaide Street, Brisbane.

Lade, F. W. H., 29 Sackville Street, Kew, Victoria.
Lamberton, H. F., c/o W. H. Panton's, Ltd., Mackay.
Landy, F. W., National Bank of Australia, Swan Hill, Victoria.
Lang, H., Thursday Island, Queensland.
Langan, Dr. A. M., Cairns.
Lather, John, Goring Street, Kelvin Grove, Brisbane.
Lather, Miss J. E. L., Girls' State School, Rocklea.
Lenox-Conyngham, Sir Gerald P., Kt., M.A., F.R.S., Trinity College, Cambridge, England.
Leonard, T. J., Victoria Street, Mackay.
*Lewis, A. A., J.P., ————
Lindley, H. W., "Jingeri," Wondai.
Londy Bros., Messrs., Brisbane Street, Ipswich.
Loose, The Rev. Thomas, The Manse, Armadale, Western Australia.
Loxton, F. E., Manager, Burns, Philp, and Co., Ltd., Brisbane.
Lucas, E. S., c/o Messrs. E. S. Lucas, East Street, Rockhampton.
Lundager, Miss M. C., Girls' State School, Mackay.

Macansh, Roland, c/o Gas Co., Warwick.
Macdonald, Hamilton, and Co. (The Manager), Mary Street, Brisbane.
Macdonnell, E., Surveyor, Enderley Avenue, Clayfield, Brisbane.
Macdonnell, H. K. N., Solicitor, Cairns.

List of Members—*continued.*

Macfarlane, Mrs. C. A., 87 Shafston Avenue, Kangaroo Point, Brisbane.
Macintosh, Hugh, Dornoch Terrace, South Brisbane.
Macintosh, T. B., J.P., Dornoch Terrace, South Brisbane.
McIntosh, J. R., Government Teacher, Darnley Island, Torres Strait.
Mackness, Miss C., B.A., Principal, Presbyterian Girls' College, Warwick.
Macleod, J. J., Macleod and Son, Jewellers, Bourbong Street, Bundaberg.
MacMahon, J. W., Q.N. Bank, Thursday Island, Queensland.
Manchester, E. J. T., M.E., Jordan Terrace, Bowen Hills.
Manning, W. J., "Daily Mercury," Mackay.
Maromattes, John, "Helios" Cafe, Roma Street, Brisbane.
Marsh, Alderman E. G., Goondiwindi.
Mason, Dr. G. W., Stoke Street, Townsville.
Massey, The Rev. C. H., The Rectory, Cleveland.
Masters, P. F., Papuan Industries, Badu, Torres Strait.
Mawdsley, A. A., Harbour Board Office, Rockhampton.
Mayers, G. R., c/o Bank of Queensland, Melbourne, Victoria.
McArthur, Robert, Riverview Street, Sherwood, Queensland.
McCarthy, Miss Pauline. Box 1565V, G.P.O., Brisbane.
McDonald, W. H., c/o National Bank of Australasia, Townsville.
*McDonald-Terry, A. J., J.P., ————
McDonnell, Dr. Aeneas J., Margaret Street, Toowoomba.
McFarlane, Rev. W. H., c/o Bishop's House, Thursday Island, Torres Strait.
McGregor, W., Pring Street, Ipswich.
McIntyre, D., "Strathmore," Toobeah.
McKenzie, Dr. A. D., Russell Street, Toowoomba.
McKeon, J., Head Teacher, Central State School, Bundaberg.
McLaughlan, Rev. Father L. F., St. Joseph's Cathedral, Rockhampton.
McLean, R. W., Railway Street, Toowoomba.
McLeod, J. J. W., "Terranora," Windermere Road, Hamilton, Brisbane.
McManus, R. F., Lake Street, Cairns.
McMaster, Hugh, "Devoncourt," Langside Road, Hamilton, Brisbane.
McNulty, J., Federal Hotel, Thursday Island, Torres Strait.
McWilliam, T. M., Mowbray Terrace, East Brisbane.
Merchant, E., Targo Street, Bundaberg.
Miller, W., Government Teacher, Darnley Island, via Thursday Island, Torres Strait.
Millward, W. A., Technical College, Warwick.
Mobsby, H. W., F.R.S.A., Fellow, Hon. Lanternist, Department of Agriculture and Stock, William Street, Brisbane.
Moody, Capt. P. H., Qantas Aerodrome, Eagle Farm, Brisbane.
Moore, Hon. A. E., M.L.A., Premier, Vice-Patron, Executive Buildings, Brisbane.
Morcom, Llewellyn, Morcom's Ltd., Printers, George Street, Brisbane.
†Morgan, F. J., Manager, National Bank of Australasia, Queen Street, Brisbane.
Morgan, Miss Edith M., Principal, Girls' Grammar School, Maryborough.
Morris, Dr. L., Caledonian Hill, Gympie.
Morrow, H. C., Morrow's Limited, North Quay, Brisbane.
Morsley, Rev. Cyril W., Sachs Street, Cairns.

LIST OF MEMBERS—*continued.*

Moseley, W. R., St. Austell Studio, Thursday Island.
Moxon, W. E., General Manager, Adelaide S.S. Co., Eagle Street, Brisbane.
Moynahan, D. J., Chemist, Cairns.
Mullard, J., c/o Wallis and Co., Wood Street, Mackay.
*Munro, E., "Darloo," Albion, Brisbane.
Murphy, Capt. W. J., Pilot, Thursday Island.
Murray, Abijah, Solicitor, Cairns.
Murray, His Excellency Hon. Sir J. H. P., K.C.M.G., FELLOW, Lieut.-Governor, Port Moresby, Papua.

Naish, G., State School, North Side, Mackay.
P5*Nathan, Rt. Hon. Sir Matthew, G.C.M.G., F.R.G.S., HON. FELLOW, Army and Navy Club, Pall Mall, London, S.W. 1, England.
Neilsen, G., George Street, Bundaberg.
Nelson, D. J., Sinclair Street, Toowoomba.
Nicholson, A. C., C.E., Harbour Board, Cairns, Queensland.
*Noble, H. G., "Instarfield," Ascot, Brisbane.
Noonan, Jas. A., Palace Hotel, Sydney Street, Mackay.
Norris, H. L., Millaa Millaa.
Nutting, Capt. Gerald, Station Street, Clayfield, Brisbane.

O'Brien, D. A., Industrial Inspector, Charleville.
O'Brien, F. L., Dentist, A.M.P. Buildings, Cairns.
O'Donoghue, James A., Department of Justice, Bowen.
O'Hara, R. E., J.P., c/o Dalgety and Co., Ltd., 65 Leadenhall Street, London, E.C. 3, England.
O'Leary, C., Protector of Aboriginals, Thursday Island.
Olley, D. W., c/o Samuel Allen and Sons, Cairns.
O'Regan, J. E., Mary Street, Gympie.
O'Reilly, Reginald De Vere, M.P.S., Palmerin Street, Warwick.
O'Shea, W., Head Teacher, North Bundaberg State School, Bundaberg.
O'Sullivan, Miss J., c/o Girls' and Infants' State School, Mackay.
O'Sullivan, M. B., Glastonbury, Gympie.
Osterlund, W., National Bank of Australasia, P.O. Box 1422T., Brisbane.
Outridge, P. P., Redland Bay.

Paine, A. A., J.P., "Illalong," Brandon, *via* Townsville.
Pares, Senor Luis Amadeo, Sandgate.
Parkinson, F. C., Elizabeth Street, Brisbane.
Pasco, M. G. C., "Nyagun," Connell Street, Toowoomba.
Paterson, Alderman F. J., Taylor Street, Toowoomba.
Payne, John C., Messrs. Payne and Payne, Solicitors, Bundaberg.
Pearce, W. J., Land Agent, Gympie.
Peart, John, C.E., M.I. Mech. E. (Lon.), Rosslyn Street, East Brisbane.
Peirson, Miss Mabel, "Morrison," Birdwood Terrace, Auchenflower, Brisbane.

LIST OF MEMBERS—*continued.*

Pender, M. P., Solicitor, Brisbane Street, Ipswich.
Pennycuick, K. G., City Engineer's Office, Rockhampton.
Perrett, Arthur, J.P., "Kaboonga," Kinbombi.
Perrott, A. V., Rose Avenue, Yeronga.
*Perry, G. H., J.P., c/o Messrs. Perry Brothers, Ltd., Elizabeth Street, Brisbane.
*Peters, F. A., Peters' Arctic Delicacy Co., Redfern, Sydney.
Peters, W., Health Inspector (Hon. Local Secretary), Bundaberg.
Phipps, J. H., King Street, East Brisbane.
*Plant, Col. C. F., F.R.A.S., J.P., "Ferndale," Ashgrove, near Brisbane.
Pollard, A. T., "Wellhouse," Ironside, Toowong, Brisbane.
Ponsford, Dr., Canberra, F.C.T.
Poole, Miss C., Gibb Street, Kelvin Grove, Brisbane.
Porter, Capt. W., Thursday Island, Torres Strait.
Porter, Wm. George, Wood Street, Mackay.
Pound, C. J., F.R.M.S., Yeerongpilly, Brisbane.
Price, Dr. T. A., Local Chairman, Russell Street, Toowoomba.

Quaid, J. D., J.P., "Ahillon," River Bank, Hill End, South Brisbane.

Rankin, R., Rankin and Carey, Merchants, Gympie.
Raymond, A. J., J.P., 178 River Terrace, Kangaroo Point, Brisbane.
Redmond, W. J., P.O. Box 81, Warwick.
Reed, Dr. E. B., Barolin Street, Bundaberg.
Reed, Dr. J. Hastings, Upper Abbott Street, Cairns.
Reid, P. E. A., J.P., Queensland National Bank, Ltd., Brisbane.
Reye, A., Flinders Street, Townsville.
Riley, Douglas, Thursday Island.
Rillie, Miss E., Central Girls' State School, Warwick.
Roberts, A. E., Box 57, G.P.O., Ipswich.
Roberts, Dr. Spencer, Quarantine Medical Officer, Thursday Island.
Roberts, Spencer, M.B., Ch.M. (Syd.), "Finchley," Toowoomba.
Robertson, A., Town Clerk, Townsville.
Robertson, Dr. (Major) W. N., C.B.E., 69 Wickham Terrace, Brisbane.
Roggenkamp, Miss Bertha A., St. John's Cathedral School, Ann Street, Brisbane.
*Robertson, Mrs. H., "Harelvyn," Abbott Street, New Farm, Brisbane.
Robinson, Sir T. B., G.B.E., K.C.M.G., 7 Cambridge Gate, Regent's Park, London, N.W.
Roden, J. H., Victoria River Downs, Katherine, Northern Territory.
Ross-Munro, W., "Ross-Roy," Indooroopilly, near Brisbane.
Rowe, Dr. J. Maurice, State Health Department, South Brisbane.
Rowe, Joseph, Bundaberg.
Rowland, J. D., East Warwick.
Rowland, P. F., M.A., Local Hon. Secretary, Boys' Grammar School, Townsville.
Rudd, F. L., c/o Walter Reid and Co., Rockhampton.
Rudd, William Henry, J.P., FELLOW, Local Chairman, Messrs. Walter Reid and Co., Rockhampton.
Rule, Capt. A., Pilot, Thursday Island.
Russell, A. W. L., Crescent Lagoon State School, West Rockhampton.
Russell, R., Jane Street, Manly.

LIST OF MEMBERS—*continued.*

Ruthning, A. F. T., Solicitor, T. and G. Building, Queen Street, Brisbane.
Ryan, Mrs. T. J., "Netherhall," Clendon Road, Toorak, Melbourne, Victoria.

San Marzano, Conte Gabrio Di, Royal Italian Consulate, Townsville.
Sandison, J. T., Victoria Pottery, Ipswich Road, South Brisbane.
Saunders, G. J., M.Sc., B.E., Principal, Technical College, Ipswich.
Schmidt, Dr. Egmont, Barolin Street, Bundaberg.
Schomberg, Rev. J. W., Moa, *via* Thursday Island, Torres Strait.
Schooley, B. L., C.E., International Well Boring Co., Ann Street, Brisbane.
Schrock, R. C., Sturt Street West, Townsville.
Scott, Dr. E. W. Kerr, Brunswick Street, Brisbane.
Serisier, W. J., P.O. Box 3, Goondiwindi.
Sexton, R. E., C.E. (Chief Engineer), Central Railway Offices, Brisbane.
Sharp, His Grace Archbishop, D.D., Hon. President, Bishopsbourne, Milton, Brisbane.
Sheldon, E. G., Surveyor, Gympie.
*Shepherd, Arthur, J.P., Milray Station, Pentland, North Queensland.
Shiel, The Rt. Rev. Lord Bishop, Agnes Street, Range, Rockhampton.
Short, Rev. Harold, F.R.G.S., London Mission, Daru, Papua, *via* Thursday Island.
Simpson, H. G., Aboriginal School, Thursday Island.
Sinclair, C. E., Hastings Street, Thursday Island.
Sinclair, H. J., Chief Engineer, Millaquin, Bundaberg.
Sinclair, Rev. John A., Sheridan Street, Cairns.
Skyring, T. D., Corberry Street, Rockhampton.
Skyring, Z. D. S., Pie Creek, Gympie.
Slade, W. B., J.P., c/o A. E. Slade, "Glenbar," Glengallan Road, Warwick.
Smith, C. E., Townsville.
Smith, E. Eldridge, c/o Harbour Board, Mackay.
P1 Sorrell, John Arnold, FELLOW, Staff Surveyor, Rockleigh, Wagga Wagga, N.S.W.
Spence, Gilbert, 117 James street, Valley, Brisbane.
Spence, Mrs. Gilbert, 117 James street, Valley, Brisbane.
Spence, Lockhart Horsburgh, J.P., c/o E. Rich and Co., Circular Quay, Sydney, N.S.W.
P1 PP Spowers, Allan A., FELLOW, Corinda, Brisbane.
Standish, R. A., Q.N. Bank, Rockhampton.
P1 Stanley, G. A. V., Science Research Scholar in Geography, 1925, "Clelands," Battery Street, Randwick, Sydney, N.S.W.
*Steele, E., Stainburn Downs, Aramac.
Steele, J. D., J.P., FELLOW, "Heathcote," Southport.
Stephens, T. B., Solicitor, Conwell and Stephens, Norman Chambers, Creek Street, Brisbane.
Stevens, F. W., 4QG, Queensland Radio Service Station, George Street, Brisbane.
Stewart, Robert, Ormeau.

LIST OF MEMBERS—*continued.*

Stiles, H. T., c/o Hume and Gostling, San Martin 235, Buenos Aires, Argentine, South America.
Stillman, W. J. E., Merchant, Cairns.
Stirling, A. C., C.E., District Engineer, Kalpowar.
Stitt, James, Warmington Street, Paddington, Brisbane.
Stone, J., Margaret Street, Toowoomba.
Storey, C., Victoria Street, Mackay.
Sullivan, A. T., Thursday Island, Torres Strait.
Sykes, F. B., Solicitor and Local Chairman, Gympie.

Taylor, Alderman C., Cairns, Queensland.
Taylor, Hon. Charles, M.L.A., Roma Street, Brisbane.
Taylor, E., J.P., Messrs. Taylor's and Elliott's, Ltd., Wholesale Chemists, Charlotte Street, Brisbane.
†Taylor, R. Sanderson, c/o Brisbane Newspaper Company, Limited, Brisbane.
Taylor, T. McI., Manager, Moreheads Ltd., Brisbane.
Thomas, J. L., Gympie.
Thompson, Dr. Robert, "Bunya Bunya," Wickham Terrace, Brisbane.
P5 Thomson, Capt. W. C., FELLOW, "Loma Langi," Ascot, Brisbane.
P1 Tolmie, Hon. James, Margaret Street, Toowoomba.
Tristram, Eric, Hope Street, South Brisbane.
Tritton, F., George Street, Brisbane.
Tryon, Henry, Highgate Hill, South Brisbane.
Tunley, W. J., "Wilstonleigh," Emily Street, Highgate Hill.
Turnbull, George, Thursday Island.
Turnbull, Wm., Hicks Island, *via* Thursday Island, Torres Strait.

*Vernon, Dr. G. H., M.C., FELLOW, Local Hon. Secretary, Thursday Island, Torres Strait.
Vidgen, H. G., Thursday Island, Torres Strait.
Vollbon, E. A., Bundaberg.
Voss, Dr. F. H. V., "Penmaen," Rockhampton.

Waddell, W. A., J.P., P.O. Box 494, Cairns.
*Wallace, W. A. J., Survey Office, Quala Lumpur, Federated Malay States.
Walsh, A. D., J.P., FELLOW, General Manager, Messrs. Dalgety and Co., Elizabeth Street, Brisbane.
Walsh, E. P., Chemist, Mary Street, Gympie.
Walsh, J. A., Messrs. Fitzgerald and Walsh, Queen Street, Brisbane.
Warrian, C. G., J.P., Hill Street, Toowoomba.
*Weedon, H. S., C.E., L.S., Box 44, G.P.O., Sydney, N.S.W.
Weir, W., Town Clerk, Sydney Street, Mackay.
Weston, J., Head Teacher, State School, Thursday Island, Queensland.
Wetherell, R., "Claverley," Langshaw Street, New Farm, Brisbane.
White, Miss Helen, M.A., Girls' Grammar School, Ipswich.
White, W. T., Authorised Surveyor, "Wynola," Campbell Street, West Toowoomba.
Whitehead, A. E., Chemist, Nicholas Street, Ipswich.
Whitehead, R. H., Stewart Street, North Bundaberg.
Whittle, Dr. H. C., John Street, Maryborough.
P2†Wienholt, Capt. Arnold, D.S.O., M.C., FELLOW, Kalbar.

LIST OF MEMBERS—*continued.*

Wilkinson, A. E., Town Clerk, Cairns.
Wilkinson, F. V., Main Roads Board, Brisbane.
Wilkinson, J. S., c/o Dalgety and Co., Townsville.
Wilkinson, L. A., Chemist, Queen and George Streets, Brisbane.
Williams, Arthur F., Mackay.
Williams, F. Stanley, Sydney Street, Mackay.
Williams, Jas. F., Local Hon. Lanternist, "Wahroonga," North Street, Mackay.
Williams, Percy, Manager, National Bank of Australasia, Stanthorpe.
P2 Williams, Thos. A., F.R.G.S., Barambah Aboriginal Settlement, Murgon.
Williams, T. L., c/o "Daily Mail," Cheapside Street, Maryborough.
P1 Williams, W. W., F.R.G.S., Union Bank Chambers, Brisbane.
Willmett, F. T., Rockport, Townsville.
Wilson, A. W., J.P., General Agent, Charters Towers.
Wilson, Dr. G., M.A., Brisbane Street, Ipswich.
Wilson, F. J., Dalgety and Co., Ltd., Brisbane.
Wilson, Lieut. A. G., Staff Corps, Thursday Island.
Wilson, W. A., J.P., FELLOW, Flinders Parade, Sandgate.
Wilson, W. B., Grafton Street, East Warwick.
Winnett, W. G., Slack's Creek, Kingston.
Wolfe, T. A., Town Clerk, Thursday Island.
Wonderley, Mrs. R. G., "Caloola," Taylor Street, Toowoomba.
*Wood, J. H., A.M.I.E. (Australia), Civil Engineer and Surveyor, 2 Stanley Grove, Canterbury, E.T., Victoria.
Woodard, Miss A. T., c/o Mrs. Dixon, "Coldstream," Lime Street, Auchenflower, Brisbane.
Woodward, F. G., National Bank of Australasia, Ltd., Brisbane Street, Ipswich.
Woody, P. H., Barandye, Wanko Siding.
Wright, D. T., Manager, Robert Reid and Co., Edward Street, Brisbane.
Wright, H., State School, Stanthorpe.
Wyatt, J. Palmer, Victoria Bridge Hotel, Townsville.
Wyer, J., Harbour Board, Cairns, Queensland.
Wyper, W., Merchant (Managing Director, Wyper Bros.), Bundaberg.

Yearwood, Miss E. M., "La Fortune," Perrott Street, Paddington, Brisbane.
Young, J., John Street, Thursday Island, Torres Strait.

Zahel, Mrs., Badu, *via* Thursday Island.

Honorary Members.

H.R.H. The Duke of York, K.G.

H.R.H. The Duchess of York.

Professor Sir T. W. E. David, K.B.E., C.M.G., D.Sc., F.R.S., University, Sydney, N.S.W.

Lady Goold-Adams, 6 Apple Tree Yard, St. James, S.W. 1 London, England.

F. W. Gregory, Sydney, N.S.W.

P1 The Right Hon. Lord Lamington, G.C.M.G., G.C.I.E., B.A., F.R.G.S., Hon. F.R.S.G.S., &c., Lamington, Lanarkshire, Scotland.

Lady Morgan, "Mia Mia," Foxton Street, Indooroopilly, Brisbane.

Lady Norman, London, England.

Viscountess Novar of Raith, Kirkcaldy, Scotland.

Her Excellency Lady Stonehaven, Federal Government House, Melbourne, Victoria.

P1 Associate-Professor T. Griffith Taylor, D.Sc., B.E., F.R.G.S., University, Chicago, U.S.A.

Honorary Corresponding Members.

P2 His Excellency Sir W. L. Allardyce, K.C.M.G., Government House, St. Johns, Newfoundland.

P1 Lieut.-General Sir Henry Chauvel, G.C.M.G., K.C.B., Military Headquarters, Melbourne, Victoria.

P1 Professor Richard Elwood Dodge, Teachers' College, Columbia University, New York City, U.S.A.

Dr. Karel Domin, Asst. Professor of Botany, Bohemian University, Prague.

His Honour Dr. W. F. Frear, 303 Stangenwald Buildings, Honolulu, Hawaiian Islands.

Hon. W. T. Harris, Ph.D., LL.D., late Commissioner of Education, Washington, D.C., U.S.A.

The Hon. W. A. Holman, K.C., Ex-Premier of New South Wales, Northfield Chambers, Phillip Street, Sydney.

P20 R. H. Mathews, L.S., Associé étranger Soc. d'Anthrop de Paris; Corr. Memb. Anthrop. Soc., Washington; Corr. Memb. Anthrop. Soc., Vienna; Local Correspondent for Australia, Royal Anthrop. Inst. London; "Carcuron," Hassall Street, Parramatta, N.S.W.

Cathcart William Methven, M. Inst. C.E., F.R.S.E., F.R.I.B.A., Club Arcade, Durban, South Africa.

Einar Lindquist, Swedish Consul-General for Australia and New Zealand, Phillip Street, Sydney, New South Wales.

P3 H. R. Mill, LL.D., D.Sc., F.R.S.E., F.R.G.S., F.R.S.G.S., Hill Crest, Dorman's Park, East Grinstead, England.

Dr. Eric Mjöberg, FELLOW, Director, Sarawak Museum, Kuching, Sarawak, Borneo.

Captain G. H. Pitt-Rivers, B.Sc., The Manor House, Hinton, St. Mary, Dorset, England.

P3 Captain J. F. Ruthven, R.N.R., F.R.G.S., Junior Carlton Club, Pall Mall, London, S.W.

J. H. Spowers, Federated Malay States.

Frederick Stubbs, F.R.G.S., Rotorua, New Zealand.

Mrs. J. P. Thomson, ————

P. Tsitsilias, LL.D., Avocat, 42 Minoulis Ave., Pireus, Greece.

A. J. CUMMING, Government Printer, Brisbane

G
51
Q83
v.38-44

Queensland geographical
journal

PLEASE DO NOT REMOVE
CARDS OR SLIPS FROM THIS POCKET

UNIVERSITY OF TORONTO LIBRARY